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Social deprivation and gender affects incidence of Hodgkin's lymphoma

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Living in overcrowded conditions appears to protect children and young adults against developing a particular type of Hodgkin lymphoma (HL), a cancer that originates from the lymphocytes (white blood cells). This protective effect seems to suggest that infections earlier in life may stimulate the immune system to deal with future infections and cancerous cells more efficiently, say the British researchers who made the discovery.

Presenting their results to the 2015 European Cancer Congress, Dr Richard McNally, a Reader in Epidemiology at the Institute of Health and Society, Newcastle University, Newcastle, UK, said the causes of HL were not well understood at present. In order to try to achieve better knowledge of this issue, the researchers decided to analyse all the 621 cases of HL in patients aged 0-24 years recorded in the Northern Region Young Persons' Malignant Disease Registry.

"Childhood lymphomas are more common in males, but analysis by sex has not been done very frequently. Additionally, the male-to-female ratio changes in HL according to age, so we decided to take age into account, as well as other factors such as socio-economic deprivation," Dr McNally will say.

HL occurrence peaks during young adulthood, and again in the over 55s. The overall five-year survival rate is around 85%. For the 0-24 year-old age group included in the study it is about 93%.

The researchers found five different sub-types of HL among the patients studied: 247 cases of the nodular sclerosis (NS) type, in which the tumour nodules are large; 105 of mixed cellularity, where a mixture of different types of inflammatory cells are involved; 58 lymphocyte rich, the sub-type with the best outcome; 68 'others'; and 143 'not otherwise specified' (NOS). Overall, more males than females within the group had HL, but the male-female ratio varied by both age group and sub-type. For the NS sub-type there were 130 males and 117 females, but this was reversed at ages 20-24, with 72 females and 55 males.

Deprivation was calculated using the four components of the Townsend deprivation score: household overcrowding, non-home ownership, unemployment, and households with no car. The researchers found a decreased incidence of the NS sub-type of HL among those patients living in areas with more overcrowded households, and a 5% increase in the level of household overcrowding had the effect of halving the number of cases of this subtype.

However, for the NOS group the reverse was seen, with overcrowding being associated with an increased incidence of this type of HL, while deprivation seemed to have no effect on the incidence of the mixed cellularity and lymphocyte-rich sub-types.

"Our findings related to the NS subtype may suggest that the recurrent infections to which children living in overcrowded conditions are likely to have been exposed stimulate their immune systems and hence protect them against developing this type of cancer later in their childhood and early adult life. Those who have a genetic susceptibility to HL and have been less exposed to infection through not living in such over-crowded conditions may have less developed immune systems as a result, and are, therefore, at greater risk of developing this sub-type," says Dr McNally.

"Another interesting finding is the preponderance of females with the

NS sub-type in the 20-24 age group. That this change takes place after puberty seems to suggest that oestrogens may be responsible in some way. There are a lot of genes directly regulated by sex hormones, and they are obvious suspects. Alternatively, epigenetic changes - changes in the way genes are switched on and off - influencing key genes, induced by sex hormones, may be responsible.

"We knew already that recurrent infections may protect against childhood leukaemia, and now it looks as we can add Hodgkin lymphoma, and, particularly its NS subtype, to the list. In order to further investigate the factors involved, prospective studies should investigate the hormonal changes and recurrent infections and their direct link to the risk of lymphoma, but such studies are difficult to do in rare diseases. A practical follow up would be case control studies examining biological markers related to exposure to a multitude of infectious agents, and indeed to hormonal status itself, while genetic studies are another possibility," Dr McNally will conclude.

Professor Peter Naredi, the ECCO scientific co-chair of the Congress, who was not involved in the research, commented: "These are interesting observations about a number of factors that may influence the possibility of developing Hodgkin lymphoma or, conversely, protect against it. Results of the case studies referred to by the presenter should add further to our knowledge of this subject."

More information: Abstract no 1414. "Correlations of incidence rates of Hodgkin lymphoma subtypes in children and young adults with age, sex and deprivation". Paediatric oncology, poster session, Monday 28 September, Hall C.

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