

ETHNIC FACTORS IN PERTHES DISEASE : A RETROSPECTIVE STUDY AMONG WHITE AND ASIAN POPULATION LIVING IN THE SAME ENVIRONMENT

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The aim of this study was to find out about the incidence of Perthes disease in different ethnic groups living in similar environments.

Among the child population of Bradford, between 1991-1997, we identified from the file notes twenty-five cases of Perthes disease among the white European population (with an incidence of 5:54500 for the year 1997) and one case of Perthes disease among Asians (with an incidence of 0:16100 for the year 1997).

There were two positive family histories of Perthes disease and only a case of bilateral Perthes disease. There was no significant difference in the incidence of Perthes disease among the rural and urban population.

We conclude that under similar environmental circumstances the genetic factor plays an important role in the predisposition to Perthes disease.

Keywords : Perthes disease ; racial incidence ; Pakistani ; Europeans.

Mots-clés : maladie de Legg-Calvé-Perthes ; incidence raciale ; Pakistanais ; Européens.

INTRODUCTION

Despite an increasing volume of literature, the cause of Perthes disease remains obscure. Despite this, there are both constitutional and environmental factors which collectively make a child more susceptible to this disease process (1). Reports from different countries around the world and indeed among different counties of the same country, reveal different incidences of Perthes disease. Nutritional, social class and various other environ-

mental differences were blamed for varying incidence in different areas (2, 3, 4).

We pursued the current study, as there was no other similar study on the incidence of Perthes disease among two different ethnic groups living in a similar environmental area and having a similar standard of living. Bradford is inhabited mainly by White European and Pakistani populations who live in similar environmental and geographical surrounding.

MATERIAL AND METHODS

Bradford is part of West Yorkshire. It is the 4th largest metropolitan district in UK with a population of 481, 300 (5). Being mainly an industrial city, Bradford attracted workers from eastern European countries after World War II, and later mostly poor agricultural workers from Pakistan and Bangla-Desh. The standard of living of the majority of both the white east European and the Pakistani population remained similar.

The overall non-white population of Bradford district is currently 18% of the total, and is 50% within large parts of Bradford City and central Keighley. In addition to the main two ethnic groups (White and Pakistani), there are Indian, African-Caribbean, Bangladeshi and other minorities (not included in the current study).

To control our study, we have included only the urban population in Bradford, rural population is excluded so that we do not miss out any patient who could have been

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referred elsewhere. As our patients have an immediate easy access to the general practitioner and a free National Health Service, none of our patients were seen outside the region. For this to happen, the general practitioner or the orthopaedic surgeon has to justify referral to other counties, as the Bradford county has to pay for the referral. After enquiring from the general practitioners and the orthopaedic surgeons in Bradford, it was found that no patients from the city were referred anywhere apart from the Bradford Royal Infirmary, the main hospital of the city.

Every general practitioner in Bradford refers any child with a limp, groin or knee pain to the on-call orthopaedic residents. In the Accident and Emergency Department, these children will be assessed and investigated and eventually referred to the Orthopaedic clinics or admitted under the supervision of the orthopaedic surgeon. There is one paediatric orthopaedic surgeon working in the city of Bradford who gets all the referrals from the Accident and Emergency Department, orthopaedic clinicians and general practitioners, therefore the likelihood that we have missed out any patient is almost nil. We have gone through a register kept by this paediatric orthopaedic surgeon's (senior author) secretary. In the current study we have gone through the clinical notes of patients diagnosed and treated by the senior author for Perthes disease between the years 1991-1997. The age, the sex, the affected side, the family history of Perthes disease, the area of residence and the patient's ethnic origin were studied. Cases of epiphyseal dysplasia were excluded from the study.

Enquiring from the general practitioners, we have found no mixed marriages with other races. and the overall figures we obtained from the census and the hospital records were checked and found to be representative of each race.

We have enquired from our social workers about the standard of living of the Asian as compared to the white population of this industrial city. The Asian families generally are bigger (mean of 4, range 2 to 7 children) compared to white families (mean of 2, range 0 to 4 children). The standard of living of both the Asian and the white were similar, generally just having average standard of living with similar incidence of unemployment. The Asian population was found to be eating eastern food almost every day ; sporadic cases of mal-nourishment have been observed among the Asians. Generally, English food was preferred among the white people.

The number of children aged 5-10 and 11-15 years for white European and Pakistani population is shown in table I and II.

RESULTS

For the year 1997, the incidence of Perthes disease among the Asians was none/16, 100 compared to 5 patients/54, 500 among the white population (table III, IV).

Among the Asian children aged 5 to 15 years only one (boy) was found to have Perthes disease. During the same period 25 white children aged 5 to

Table I. — Showing the annual number of the White population aged 5-10 and 10-15 (1991-1997)

Year	1991	1992	1993	1994	1995	1996	1997
White (5-10)	29,100	29,250	29,550	29,900	30,100	30,550	30,900
White (11-15)	22,550	22,750	23,150	23,500	23,700	23,700	23,600

Table II. — Showing the number of the Asian population (1991-1997)

Year	1991	1992	1993	1994	1995	1996	1997
(5-10)	9,200	9,000	8,850	8,750	8,550	8,450	8,550
(11-15)	6,650	7,200	7,450	7,600	7,650	7,600	7,550

Table III. — Number of new cases of Perthes disease developed annually among the age matched white population

Year	1991	1992	1993	1994	1995	1996	1997
Age (5-10)	—	1	1	6	1	9	5
Age (10-15)	2	—	—	—	—	—	—

Table IV. — Number of new cases of Perthes disease developed annually among the age matched Asian population

Year	1991	1992	1993	1994	1995	1996	1997
Age (5-10)	—	—	—	—	1	—	—
Age (10-15)	—	—	—	—	—	—	—

15 years were found to have Perthes disease. Eighteen of these patients were males (17 in the age range of 5-10 years, only one patient was 11 years old) and 7 females (5 in the age range between 5-10, one patient aged 15 and another one aged 5). The sex ratio of male to female was 2.5. The age range of children with Perthes disease (both male and female) was between 5 and 8 years in 75% of our patients. (table III, IV). The left hip was involved more than the right one (60%). In one case the other hip was subsequently involved within a year of onset of the disease. Twelve patients were from rural area and the other 13 were among the urban population. Among the white population, two patients among the 25 patients with Perthes disease (8%) had positive sibling family history of Perthes disease.

DISCUSSION

Different rates of incidence for Perthes disease have been reported from different regions around the world (1-5, 7-12) as shown in tables V and VI.

The epidemiology of Perthes disease is an under-researched topic and a difficult task. There is still debate about the relative etiological importance of genetic and environmental factors. One way of studying this question is to compare the incidence in different ethnic groups living in similar environments. Any difference would presumably reflect genetic rather than environmental influences. There is enough evidence in the literature suggesting a genetic causation for Perthes disease (9, 10), therefore any study of confounding factors (social class, nutrition, rural and urban factors) without comparing different races living in a similar environment, is inadequate.

The difficulties inherent in our epidemiological survey were :

Table V. — Incidence of Perthes disease in various parts of the world

Source	Area	Incidence
Molloy, <i>et al.</i> 1966	Massachusetts	1:1200
Helbo, <i>et al.</i> 1953	Denmark	1:2300
Gray, <i>et al.</i> 1972	British Columbia	1:1400
Joseph, <i>et al.</i> 1988	Udupi Taluk race/ South India	4.4:100 000
Moberg and Rehnberg 1992	Uppsala County	8.5/100 000 in children 0-14 years of age

Table V. — Incidence of Perthes disease in various parts of the world

Source	Area	Incidence
Harper, <i>et al.</i> 1976	South Wales	1:4750
Catterall, <i>et al.</i> 1970	Scotland	1:5590
Barker, <i>et al.</i> 1980	England (Merseyside, Trent, Wessex)	1:12500
Our survey (1997)	Bradford (West Yorkshire)	No single case of Perthes' disease among 16 100 Asian children age 5-15 years. 5 cases of Perthes; disease among 54 500 white children aged 5-15

1. The definition of the numerators. The races were defined in the current study after enquiring from the parents about the race. Surnames and religion were not taken into consideration. The census carried out in Bradford in 1994 was based on visiting individual families and enquiring about race together with other questions.

2. Other potential sources of errors (such as bias, misclassification and confounding). Cultural, religious, behavioural, dietary, social and other factors also come into equation and sorting these out from each other and from genetic influences is a task of daunting complexity

Despite the above mentioned difficulties encountered and the difference of the size of the current two samples, this is the only study which clearly shows an obvious difference in the incidence of Perthes per percentile of population among two different races living under the same environment but for their food habits. The white population usually eat less spicy food and use lard in their cooking. The Asian on the other hand use instead oil for cooking and some are vegetarians. Furthermore the familial tendency was obvious, 8% of our white population with Perthes disease patients had a positive family history. Despite the fact that the aetiology of Perthes disease is still unknown, and the real genetic abnormality predisposing to Perthes disease remains obscure, the incidence of Perthes disease is different between two different races living in the same environment. We feel that the racial factor is more important than geographical, nutritional and social factors predisposing to the disease.

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SAMENVATTING

A. A. FARAJ, A. B. NEVELOS. *Etnische factoren in de ziekte van Legg-Calvé-Perthes: retrospectieve studie bij blanke en aziatische populaties in een zelfde omgeving levend.*

Het doel van de studie was om uit te maken of er raciale verschillen zijn in de incidentie van Perthes bij populaties in een zelfde omgeving. In de pediatrie populatie van Bradford vonden de auteurs tussen 1991 en 1997, 25 gevallen van Perthes bij 372.300 blanken en één casus bij de 113.00 aziatische kinderen. Er waren er twee met een positieve familiale incidentie en één bilaterale casus. Er was geen verschil tussen de stads- of platelandsbevolking.

Bij een gelijkaardige omgeving spelen etnische factoren een essentiële rol in de voorbeschiktheid tot Perthes.

RÉSUMÉ

A. A. FARAJ, A. B. NEVELOS. *Facteur ethnique dans la maladie de Legg-Calvé-Perthes: Étude rétrospective dans des populations blanche et asiatique vivant dans le même environnement.*

Ce travail avait pour but de déterminer l'incidence de la maladie de Legg-Calvé-Perthes dans différents groupes ethniques vivant dans un environnement comparable. Entre 1991 et 1997, les auteurs ont relevé dans la population infantile de Bradford 25 cas de maladie de Legg-Calvé-Perthes parmi les enfants européens de race blanche et un seul cas parmi les enfants de race asiatique. Pour l'année 1997, cela représente une incidence de 5 sur 54.500 enfants de race blanche contre 0 sur 16.100 enfants de race asiatique. Il y avait dans deux cas une histoire familiale de maladie de Legg-Calvé-Perthes; il n'y avait qu'un cas bilatéral. Il n'y avait pas de différence significative dans l'incidence de la maladie entre la population rurale et la population urbaine. Les auteurs concluent que, dans des conditions d'environnement identiques, le facteur génétique joue un rôle important dans la prédisposition à la maladie de Legg-Calvé-Perthes.