Unilateral Perthes' Disease;A Study of the unaffected hip joint.

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الخلاصة: تمت الدراسة على (32) مريض مصابين بمرض بيرثيس لجهة واحده من مفصل الورك وتمت مقارنتهم بأربعين طفلا طبيعين ، وركزت الدراسة على طول وعرض العظم في منطقة النمو القريبه لرأس عظم الفخذ الغير مصاب لفتره سنتين تقريبا ،وقد بينت الدراسة ان ارتفاع منطقة النمو القريبه في المفصل الغير مصاب هو أقل مقارنتا بالاطفال الطبيعيين ، ومن الممكن اعتبار هذا التأخر في التعظم كعلامه لظهور مرض بيرثيس في الاطفا ل.

Objective: To asses the epiphyseal development of the unaffected hip in unilateral perthes disease. **Patients and methods;** Thirty two patients with unilateral perthes disease,their normal unaffected hip joints compared with forty normal children regarding their ossification of the proximal capital femoral epiphysis over aperiod of two years . **Results;** The epiphyseal height of the normal hip in unilateral Perthes disease was less than for the normal children (compared group).**Conclusion;**Delay in ossification of the proximal head may be one of the risk factors for Perthes disease.

Introduction:

Perthes' diseas is a painful disorder of childhood characterized by a vascular necrosis of the femoral head. Boys are affected four times as often as girls .The condition may be part of generalized disorder of growth[1] . Various genetic, epidemiological, biochemical ,and other factors associated with this condition have been studied ,but the underlying nature of the vascular disturbance is still unknown.

Inherited thrombophilia has been postulated as a contributory cause[1].Some auther have suggested that intravascular thrombosis of the vessels to the femoral head may be related to coagulopathy involving protein C and Sand hypofibrinolysis[2,3] .Clinical observations ,however, indicate that the disease can no longer be considered to be a focal vascular accident in the capital femoral epiphysis [4] .

Patients and Methods;

Thirty-two patients with unilateral perthes' disease from Octuber 2005 to September 2007 and forty healthy children as a control group were enrolled in this study . There were twenty-four boys and eight girls .The right hip was affected in twenty patients and the left hip in twelve patients. The mean age at diagnosis for the girls 6.1 (3 - 9.2) and for the boys 7.3 (3.5 - 11.1) .

Anteroposterior radiograph were taken for all children at the time of diagnosis and compared with those for normal children . Follow-up over a period of two years ,serial X-rays were taken every six months , the epiphyseal height (EH) and epiphyseal width (EW) were measured and compared with that of the healthy children (Fig (1). The statistical analysis were performed using Stat View 4.5 (Abacus Concept, Berkeley, California).

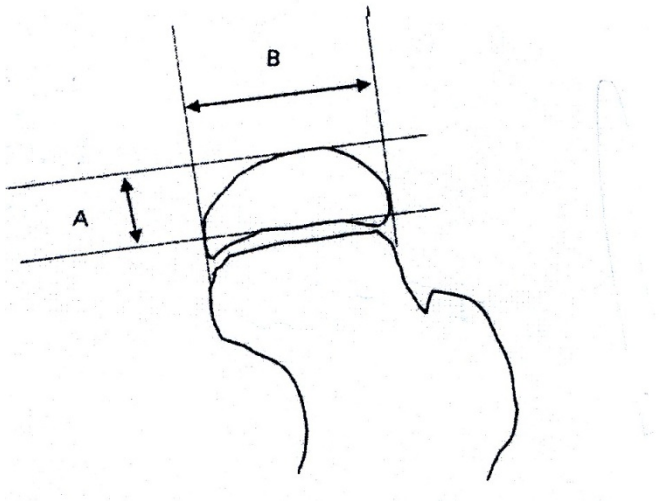

Figure 1

The measurement of the EH (A) and EW (B) based on AP pelvic radiograph[5].

Results;

In 28 patients (89.6%) the epiphyseal height (EH) was less than that for normal children; in 8 patients(25 %) it was below -2 SDs of the control group. There was significant difference ($p < 0.0001$) between the epiphyseal height (EH) of the un affected hip for the children with Perthes disease as compared with those control group .

Discussion;

A reduction of the epiphyseal height (EH) of the unaffected hip in most of our patients indicated that there may be abnormal development of the femoral head in this disease. Harrison and Blakemore[6] performed a radiological analysis of the unaf-fected hip in children with unilateral disease and showed that 48. 4% of the patients had irregularities of the surface and flattening or dimpling of the femoral head.

A similar reduction in the EH:EW ratio which represents a flattening of the epiphysis is seen in several bone dysplasias. Van Mourik and weerdenburg[7] described a reduction in the EH compared with the EW of the distal femoral epiphysis in 11 of 12 children with multiple epiphyseal dysplasia (MED) which is characterized by retardation of growth of the epiphyseal ossification in various parts of the body. Mandell et al[8] reported that avascular necrosis of the capital femoral epiphysis may be seen in MED as well as in perthes' disease. The similarities between the two disorders imply that the flattening of the femoral head associated with delayed maturation of the secondary ossification center could be related to vascular disturbances.

Kikkawa, Imai and Hukuda[9] performed a detailed radiological and histological

analysis of the femoral heads in spontaneous hypertensive rat (SHR) which has osteonecrosis of the femoral epiphysis resembling the clinical features of perthes disease. The expression of type –X-collagen during epiphyseal ossification was delayed in SHRs, and the osteonecrosis was proceeded by a disturbance of mineralization and ossification of cartilage . These observations suggested that abnormal development of the femoral epiphysis occurred much earlier than the manifestation of osteonecrosis . Ponseti et al[10]

showed that the abnormal areas in the epiphyseal cartilage of patients with Perthes disease had different histochemical and ultrastructural properties from those of normal cartilage and fibrocartilage . They mentioned that the collapse and necrosis of the femoral head could result from the breakdown and disorganization of the matrix of the epiphyseal cartilage ,followed by abnormal ossification .

Delay in ossificastion of the epiphysis of the femoral head may be one of the risk factors for Perthes disease although the mechanism has not yet been defined . It may lead to mechanical vulnerability of the epiphysis,and the increasing mechanical stress could result in collapse of the immature epiphysis ,particularly anterolaterally, where weight bearing forces are maximum. The concomitant breakdown of the epiphysis may cause vascular occlusion.

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