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DEMOGRAPHIC CHARACTERISTICS OF CHILDREN WITH RECURRENT FEBRILE CONVULSIONS DUE TO UPPER RESPIRATORY TRACT INFECTIONS

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ABSTRACT

This is a prospective, hospital based, case–control study conducted at Alsalam and Algumhury hospitals which are general hospitals in Ninavah province in Iraq and during the period from April 1st to December 31st 2018 to assess the influence of age and as sex a risk factors on the recurrence of febrile convulsion. The study includes 206 patients with febrile convulsion the patients were grouped in to 116 patients (cases) aged (5 months-6 years) with recurrent febrile convulsion or more febrile convulsion.) and 90 patients (controls) who has single Febrile convulsion at age between (5 months -6 years) and became older than 6 years with no recurrence of febrile convulsions were labeled as febrile by excluding infections of central nervous system in developmentally normal children on the basis of history, Examination and relevant laboratory investigations. Both groups of patients (cases and controls) were compared for possible effect of age and as sex a risk factors for recurrent of febrile convulsion Age of 15 months or less at the onset of first febrile convulsion Male sex were identified as a risk factors for recurrent febrile convulsion. Those children whose risk of recurrent is high should probably be started on continuous prophylaxis after the first febrile convulsion or at the onset of each febrile illness oral diazepam is administered for the duration of illness (usually 2-3 days).

KEYWORDS: The study includes 206 patients with febrile convulsion the patients were grouped in to 116 patients (cases) aged (5 months-6 years) with recurrent febrile convulsion or more febrile convulsion.)

INTRODUCTION

Definition and Causation

Febrile convulsion (FC) is most frequently occurring epilepsy syndrome and 2-4% of all children experience at least one FC. It is defined as an event in neurologically healthy infant/children between 6 months and 5 years of age associated with fever>38 ºC (rectal temperature) but without evidence of intracranial infection as defined cause and no history of prior a febrile seizures.[1]

Only 5% occurring less than 6 months of age or after 4 years The incidence is slightly higher in boys than girls, but they tend to occur earlier in girls due to their more accelerated brain development. In some third world countries a fit with fever can be the commonest cause of death.[2]

Most children who experience FC have first convulsion between 12 and 15 months of age. Few children will have first episode after 3 years. It has been experienced that 21% children had convulsion either before or within one hour of onset of fever, 57%had convulsion between 1 and 24 hours of onset of fever and 22% had convulsion more than 24 hours after onset of fever.[3]

Most FC occurs early in OMPA (Otitis media, pharyngitis, and adenitis) illness. Gastroenteritis, especially when caused by shigella or campylobacter and urinary tract infection are less common causes. Roseola infantum is a rare but classic cause.

One study implicated viral causes in 86% of cases. Immunization may be a cause.[4]

Gastroenteritis possess a particular problem. In a study by A vital (1982) of 117 children with shigella gastroenteritis, 31% presented with convulsions and up to 25% of children with campylobacter infections may present with convulsions. In these cases the fits are secondarily to a toxic encephalopathy due to a circulating toxin from the gut organism. In a similar way shiga or vera toxins from E. coli 0157 may cause fits

associated with the hemolytic-uremic syndrome. Fits in children with gastroenteritis may also be due to a secondary metabolic upset e.g. hyponatremia, hypernatremia, hypocalcemia, hypomagnesemia. None of the above should be regarded as FC [(2)].

1.1 Clinical Manifestation

A simple FC is usually associated with a core temperature that increases rapidly to 39ºC or greater.[5]

Simple FC is generalized seizure, lasting less than 15 minutes, not recurring within 24 hours, and with no postictal neurological abnormalities. Complex FC is focal, prolonged or recurrent within 24 hours or associated with postictal neurological abnormalities including Todd's Paresis. These seizures constitute around 15% of febrile seizures.[6]

Febrile status is seizure duration of 30 minutes or more, either one long lasting or a series of shorter seizures without regaining consciousness intricately. Some children are at increased risk of developing FC. The following factors are associated with increased risk

a. A first or second degree relative with history of FC.
b. Neonatal Nursery stay of more than 30 days.
c. Developmental delay.
d. Attendance at day care center. Children with two of these risk factors have 28% chances of experiencing at least one FC.[7]

Approximately 30-50% of children have recurrent seizures with later episodes of fever and a small minority have numerous recurrent seizures. Although children with simple febrile seizures are at no greater risk of later epilepsy than the general population.

Some factors are associated with increased risk. These include the presence of atypical features of the seizure or postictal period, a positive family history of epilepsy, an initial febrile seizure before nine months of age, delayed developmental mile-stones, or a pre-existing neurologic disorder. The incidence of epilepsy is approximately 9% when several risk factors are present, compared with an incidence of 1% in children who have FC and no risk factors.[7]

1.2 Investigations

During the acute evaluation, a physician's most important responsibility is to determine the cause of the fever and to rule out meningitis. If any doubt exists about the possibility of meningitis, a lumbar puncture with examination of the cerebrospinal fluid (CSF) is indicated.

Seizure–induced CSF abnormalities are rare in children and all patients with abnormal CSF after a seizure should be thoroughly evaluated for other causes.[5]

Under the age of 6 months a convulsion associated with fever should be considered as a sign of CNS infection. Between 6 and 18 months the signs of meningitis are nonspecific and our policy would be to do a lumbar puncture in all patients in this age range presenting with a first febrile convulsion. Over 18 months a selective policy is used: If the child appears well, fully conscious with no signs of meningism and has an obvious source of infection lumber puncture can be avoided. However if such a decision is made and the child is not admitted to hospital the doctor must review the child over the next 24h. for change in condition.[2]

A side from glucose determination, laboratory testing such as serum electrolyte and toxicology screening should be ordered based on individual clinical circumstances such as evidence of dehydration. An electroencephalogram (EEG) is not warranted after a simple febrile seizure but may be useful for evaluating patients with an atypical features or with other risk factors for later epilepsy.

Similarly, neuroimaging is also not useful for children with simple febrile convulsions, but may be considered for children with atypical features, including focal neurologic signs or pre-existing neurologic deficits.[7]

A white count above 20.000/µl or with an extreme left shift may correlate with bacteremia ; complete blood count and blood cultures may be appropriate studies.[4]

1.3 Guidelines of treatment

FC is a benign and self-limiting condition and does not require any treatment. Counselling of parents and reassurance is all that is necessary. However, prolonged febrile seizure should be terminated by diazepam intravenously or per-rectaly .Intermittant prophylaxis with benzoidiazepine is indicated in frequent FC and high risk group. Continuous antiepileptic drug therapy with sodium valproate or phenobarbitone is rarely indicated and should be used judiciously. Antipyretics at the onset of fever thought widely practiced are seldom effective in preventing FC.[8]

1.5 Prognosis

Excelent less than 3% develop long-term epilepsy despite the strong genetic predisposition, but the prognosis is more guarded if the convulsion is prolonged or atypical. Up to 40% may have another convulsion and 15% a third episode. If the child suffers from multiple repeated febrile convulsions the possibility of early malignant epilepsy such as myoclonic epilepsy of Dravet exist.[2]

1.6 CONCLUSION

Although a frightening event the FC is a benign condition. Treatment is rarely indicated for simple FC. Even in most children with complex FC or recurrent FC no treatment is needed. Given the available data a rational goal of therapy would be to prevent prolonged FC. Therefore treatment is indicated particularly in those at risk for prolonged or multiple convulsion or those who

live far from medical care; rectal diazepam or diazepam gel used at the time of seizures as an abortive agent would seem most logical choice . An understanding of the natural history and prognosis will enable physician to reassure the families and provide appropriate counseling and management while avoiding unnecessary diagnostic and theraputic interventions.[17]

1.7 Effect of age and sex as a risk factors for recurrent febrile convulsion

1.7.1 Age of the patient at the onset of the first FC

Berg and colleagues serious, BergAT et al, Vanstuijvenberg M et al, Laditan AA founds that an age of less than 18 months at the onset of the first FC is a risk factor for recurrent of FC.[10,13] Kundesen FU, Rantala H et al, Tarkkar et al founds that an age of less than 15 months at the onset of the first FC is a risk factor for recurrence of FC.[14,16] Al-Eissa YA found that age at the onset of FC less than 12 months is a risk factor for recurrent FC.[17] Martin- Fernandez jj et al found that age at the onset of FC less than 16 months is a risk factor for recurrent FC.[18] Offringa M et al found that an age of at least 30 months at the initial seizure are associated with a decreased risk of recurrence.[19]

1.7.2. Sex

Bessisso MS et al noted that risk factor for recurrence of FC were male sex as male to female ratio was 2.25% (P=0.02).[20] Airede AI. Also found that male sex is a risk factor for recurrence of F.C. (21) AL Eissa YA found that gender not related to the recurrence of febrile convulsion.[9]

2. The Aim of the study

The aim of the study is to assess the influence of age and sex on the recurrence of FC.

3. PATIENTS AND METHODS

This is a prospective, hospital-based, case-control study conducted at, at Alsalam and Algumhury hospitals which are general hospitals in Ninavah province in Iraq during the period from April 1st to 31 December 2018. The study include 206 patients with FC, the patients were grouped into 116 patients (cases) aged (5 months -6 years) with recurrent FC (2 or more FC) and 90 patients (control) who has single FC between (5 months -6 years) of age and became older than 6 years with no recurrence of FC.

Convulsions were labeled as febrile by excluding infections of central nervous system in developmentally normal children on the basis of history, examination including neurological examination and relevant laboratory investigations according to the provisional diagnosis for e.g lumber puncture, to obtain C.S.F as well as serum calcium, blood sugar, throat swab for culture and sensitivity blood urea, serum creatinine, G.S.E, stool culture, GUE, urine culture, CXR, EEG.

Both groups of patients (cases and control) were compared for possible Effect of age and sex as risk factors for recurrent FC and information were taken about their : Age at the onset of the first FC, (5-15 months, 15-30 months, 30 month-6 years), sex.

The information was obtained directly from mothers of the patients (Case and Control).

Our patients with recurrent FC (cases) were admitted to the hospital while those with single FC (control) some of them admitted to the hospital for other medical non relevant problem and other were taken from out patients department.

Data was analyzed using chi square and P- value considering value of < 0.05 significant.

4. RESULT

The study found the following regarding

4.1. Age at the onset of the first FC

A. great majority of cases (75 patients which represent 64.65%) with recurrent F.C have their first F.C at (5-15) months of age compared to 36 patients which represent 40% of controls with single F.C who have their F.C at (5-15) months of age . This shown significant higher percentage of cases compared to controls, so that an age of 15 months or less at the onset of the first FC is a risk factor for recurrent F.C were X2= (13.3), P= 0.001 (significant) as shown in table (1).

B. 29 Patients which represent 25% of the cases have first FC at (15-30) months of age compared to 33 patients which represent 36.67% of the controls have first FC at (15-30) months of age which show lower percentage of cases compared to the control.

C. 12 patients which represent 10.35% of cases have first FC at 30 months -6 years of age compared to 21 patients which represent 23.33% of the controls have first FC at 30 months -6 years of age and this show significant lower percentage of cases compared to controls . So that an age of at least 30 months at the initial seizure are associated with a decreased risk of recurrence of FC as shown in table (1) Table (1): Distribution of the age group of the patients (cases and controls) at the onset of the first F. C

Table (1): Distribution of the age group of the patients (cases and controls) at the onset of the first F. C.

Age group months	No. of cases	%	No. of Controls	%
5-15	75	64.65	36	40
15-30	29	25	33	36.67
>30-6 years	12	10.35	21	23.33
Total No.	116	100	90	100

$X^2 = 13.3$

d. f = 2

P. V = 0.001 Significant

4.2. Sex

Male sex is a risk factor for recurrence of FC were male to female ratio in cases was 2.2:1 compared to 1:1 in controls were X2= 6.01 P=0.014 (significant) as shown in table (2).

Table (2): Sex Distribution of Patients. (Cases and Controls)

Risk Factor	Exposure Category	No. of Cases	%	No. of Controls	%
Sex	Male	80	68.96	47	52.22
	Female	36	31.04	43	47.78
Total No.		116	100	90	100

$X^2 = 6.01$

d. f = 1

P. V = 0.014 Significant

5. DISCUSSION

This study showed that regarding the risk factors for recurrence of FC.

5.1. An age of less than 15 months at the onset of the first FC. is a risk factor for recurrence of FC this result goes with the following studies (Knudsen FU, Rantala H, et al, Tarkkar ET AL).[14,16] also the result of our study is nearly identical with the following studies :- Berg and Colleagnes serious, Berg AT, et al, Van stuijenberg M et al, Laditan AA. Who founds that an age of less than 18 months at the onset of the first FC is a risk factor for recurrence of FC.,[10,13] Martin –Fernandez JJ et al found that age at the onset of FC less than 16 months is a risk factor for recurrence FC.[18] Our study also showed that an age of at least 30 months at the initial seizure are associated with a decreased risk of recurrence of FC this finding is consistent with the finding of Offringa M et al.[19]

5.2 Male sex is a risk factor for recurrence of FC and this was provide by Bessisso MS et al, Airede AI Studies.[20,21] but this result is not compatible to what is found by al Eissa YA study who found that gender not related to the recurrence of FC.[17]

6. CONCLUSION S AND RECOMMENDATIONS

6.1 Conclusions

- Age less than 15 months at the onset of the first FC, male sex are associated with increased incidence of recurrent FC.

6.2 Recommendations

- Those children whose risk of recurrence is high should probably be started on continuous prophylaxis after the first FC or at the onset of each febrile illness oral diazepam (1 mg /kg25 hr) in three divided doses is administrated for the duration of the illness (usually 2-3 days). The side effects are usually minor, but symptoms of lethargy, irritability, and ataxia may be reduce by adjusting the dose.
- Improve the educational level of the mothers about the risk of recurrence of FC, avoidance of febrile illness, prompt medical seeking and close follow-up of their children who are at high risk of recurrence with each febrile illness.
- Pay more attention to the health educational programs and this can be achieved through TV programs, educational leaflet, lectures … ets.

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