International Journal of Chemical and Biochemical Sciences
(ISSN 2226-9614)

Journal Home page: www.iscientific.org/Journal.html

Ketogenic diet effect on refractory epilepsy; a study done in Minia university hospital, Egypt

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Abstract

Epilepsy is a disease of the brain characterized by any of the following conditions: at least two unprovoked (or reflex) seizures occurring >24 h apart; one unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk (at least 60 %) after two unprovoked seizures, occurring over the next 10 years; diagnosis of an epilepsy syndrome. Status epilepticus (SE) is a potentially life-threatening condition resulting either from the failure of the natural homeostatic suppressing mechanisms responsible for seizure termination or from the initiation of mechanisms leading to abnormally prolonged seizure activity. About 31%−43% of the patients with SE are not controlled with first- and second-line treatments and enter in refractory SE (RSE), requiring intravenous anesthetic drugs. About 15% of the patients will progress further to super-refractory SE (SRSE), defined as SE that persists for more than 24 h after the initiation of anesthesia or recurs on the reduction or withdrawal of anesthetic drugs. New-Onset Refractory Status Epilepticus (NORSE) is the clinical presentation describing a patient without active epilepsy or other preexisting relevant neurological disorder occurring without age limitation. It is characterized by de novo onset of RSE without a clear acute or active structural, toxic, or metabolic cause. Refractory epilepsy is a kind of epilepsy that has not achieved persistent seizure-free after the correct application of two tolerable antiepileptic drugs. Data show that 20% of children with epilepsy may eventually have refractory epilepsy. Long-term seizures of epilepsy may not only lead to persistent neuropsychiatric disorders, affect the cognitive function of children, but also adversely affect the growth and development of children. The current clinical treatment methods mainly rely on oral antiepileptic drugs, vagus nerve stimulation, and so on. Ketogenic diet (referred to as KD) is an important dietary therapy for the treatment of refractory epilepsy, which is economical, practical, and effective way of treatment. Ketogenic diet is a high-fat, low-carbohydrate diet that induces ketosis. Ketosis is a metabolic state where the body uses ketone bodies, made from the breakdown of fatty acids in the liver, rather than carbohydrates as primary source of energy. In our study, we have recorded our experience at inpatient unit of pediatric neurological department of Minia university hospital, of using ketogenic diet as an alternative treatment for refractory epilepsy. We have selected 20 cases of refractory epilepsy of different ages and gender to observe the effect of using a 6 months KD protocol on the frequency of attacks of convulsions of these children.

Keywords:

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1. Introduction

Epilepsy constitutes a brain disorder characterized by a lasting predisposition to generate epileptic seizures and by the neurobiological, cognitive, psychological and social consequences of this condition [1]. Epilepsy is a common pathology affecting 65 to 70 million people worldwide [2]. The management of this chronic disease aims to control seizures while preserving the patient's quality of life (QOL) [3]. Treatment is based on anti-epileptic drugs, which help control seizures in more than two-thirds of cases. Nevertheless, nearly one third of patients will continue to have seizures despite a well-conducted treatment, thus justifying the use of further therapies such as ketogenic diet (KD) or surgery [4]. KD is a high-fat (providing a range of 55 to 90% calories as fat), adequate protein (accounts for 30-35% of the daily caloric requirement supplied; minimum of 1 g/kg of protein), low-carbohydrate diet (only 5-10% of total calorie intakes are provided by carbohydrates, less than 50 g/day) [5]. The term KD currently refers to any dietary therapy which results in a metabolic ketogenic state. Ketones can result from the breakdown of fat; it is then an oxidation of fatty acids, secondary to a restriction in carbohydrates. Several studies have demonstrated the effectiveness of KD on refractory epilepsies especially in children [6]. Although KD is not a substitute for pharmacological treatments, it often reduces the number of

antiepileptic drugs taken as combination therapy as well as their dosages [7].

2. Patients and methods

This study had been done on 20 child complaining of refractory epilepsy attended the out-patient clinic of neuro-pediatrics at Minia university hospital, Egypt, in order to assess the effect of ketogenic diet on controlling fits attacks of these children after 6 months of induction of ketogenic diet protocol. We had taken a careful history of these 20 patients before induction of ketogenic diet protocol to assess the severity and frequency of fits. Then we had retaken a careful history of those 20 patients after 6 months of induction of ketogenic diet protocol to assess the changes that happened on the severity and frequency of fits of those patients.

3. Results

This study included 20 patients, where 12 of them were males and 8 were females. The age of the patients was ranged from 2-years old up to 14-years old. With 14 patients where <5 years old and 6 patients >5 years old as Shawn in table A. The result of the study Shaw that 8 patient out of the all 20 patient, after 6 months of ketogenic diet protocol, had decreased number of convulsions than before, while 12 patient there were no improvement in frequency of convulsions as Shawn in diagram [1].

4. Discussion

We had noticed a significant reduction of the frequency of convulsions in 8 patient of the study sample (about 40% of patients) and an improvement of their life style, that we recommend the use of this protocol in our department of pediatrics.

Table A: demographic distribution of study patients

N (number of patients)	Male		Female		total	
	(n=12)	60%	(n=8)	40%	(n=20)	100%
< 5 years	9	45%	5	25%	14	70%
> 5 years	3	15%	3	15%	6	30%

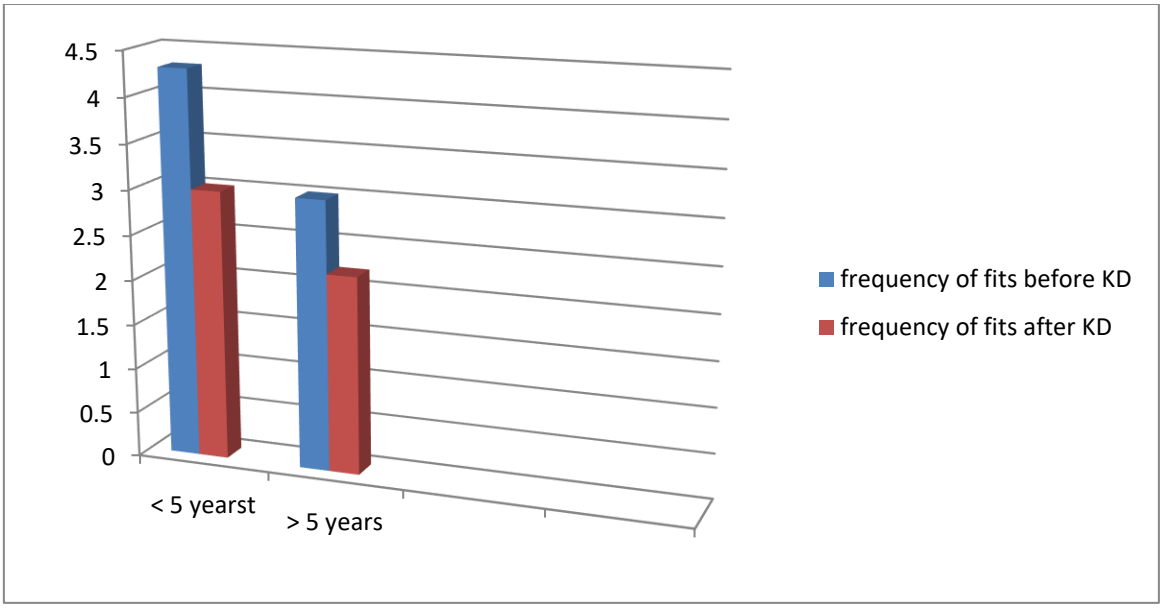

Figure 1: the effect of 6 months protocol of ketogenic diet on the frequency of convulsions.

4. Conclusions

In our study, we have recorded our experience at in patient unit of pediatric neurological department of Minia university hospital, of using ketogenic diet as an alternative treatment for refractory epilepsy.

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