

ABDOMINAL MIGRAINE AND EEG NEUROFEEDBACK THERAPY; A CASE STUDY OF 12 YEARS OLD GIRL

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ABSTRACT

In this study we present a case of 12 years old girl who suffered from abdominal migraine and was treated by EEG Neurofeedback therapy for several sessions. Diagnostic criteria have been established by international classification of headache disorders and Rome III criteria for functional gastrointestinal disorders. Brief Psychiatric Interview and comprehensive Psychological tests battery including Revised Children's Manifest Anxiety Scale, The Childhood Depression Inventory 2, Human Figure Drawing and Coloured Progressive Matrices was administered to determine the possibility of other psychiatric disorder. Clinical interview, psychological tests reports and integrated medical evaluation findings were found consistent with history and diagnosis of abdominal migraine. Neurofeedback sessions were offered consecutively according to the standard protocol in order to heal the abdominal migraine. Our findings including self report, post treatment assessment and collateral history feedback reported a significant improvement in the abdominal migraine symptoms. It concludes that this case is an example that EEG Neurofeedback therapy was found successful in the treatment of abdominal migraine.

KEY WORDS:

Abdominal migraine. Psychiatric interview, EEG Neurofeedback therapy,

INTRODUCTION

Functional abdominal pain has been reported as the most common diagnosis in 9-15% of all children and adolescents and has been categorized into four groups such as irritable bowel syndrome, functional dyspepsia, abdominal migraine and abdominal pain syndrome. However, abdominal migraine is frequently found as a consequent of recurrent abdominal pain in children¹.

Historically, abdominal migraine was for the first time described in 1921². Now it has been classified in the international classification of headache disorders³ and also in the Rome III criteria for functional gastrointestinal disorders⁴. Abdominal migraine has been illustrated in a periodic syndrome by paediatricians, which include headache and abdominal pain accompanied by pallor and vomiting⁵. It is also called paroxysmal disorder that characterized by acute, non-colicky, incapacitating, midline abdominal pain that lasts for hours and manifests anorexia⁶. The estimated prevalence of abdominal migraine is 4 % in children age 5-15 years often found in girls with an onset age of ten and decline fast afterwards. Family history has been reported in most cases and the common symptoms present are; abdominal pain and headache that disturb child's normal daily activities. The parents are unable to find out the obvious evidence for cause of this disorder^{7, 8}. Nevertheless evidence shows that stressful events, exposure to flickering, high-tyramine diet and food colourings precipitate abdominal migraine attacks.

Studies report anti-migraine prophylactic therapy, Pizotifen⁹, Propranolol¹⁰, Cyproheptadine¹¹ divalproex sodium¹² and Triptan¹³ are effective in the prevention of recurrent abdominal migraine attacks. Prophylactic therapy and coping methods limit the child activities, restrict to small number of food, parents and child need to be very patient in this process and also need to record the details of food¹⁴. Keeping in view Carson et al, (2011)¹ stated that investigation and studies are needed to identify effective treatment options in abdominal migraine in children.

Non invasive treatment strategy such as Neurofeedback and Biofeedback training brings awareness of client to excessive muscle tension in the body and headache; it can be use in the management of abdominal migraine¹⁵.

Neurofeedback/Biofeedback studies have shown abnormal patterns of the cortical activity cause, neurological, psychological and medical disorders. Neurofeedback modify the patterns and helps to normalize brain function¹⁶. EEG Neurofeedback training has been employed as a therapeutic method, which has been design on scientific idea that the mind and the body are interconnected. This treatment method optimizes brain function in order to improve physical, cognitive, emotional and behavioural experiences¹⁷. It is a computer-based non-invasive method of treatment works on operant conditioning principles. The therapist trained the client on the principle to give brainwave feedback to them, which helps to get well without using psychiatric medication¹⁸. It has shown proven efficacy in the treatment for a range of psychiatric disorders¹⁹ and has been used for the amelioration of abdominal migraine in this case study.

For the purpose of diagnosis in this case study, diagnostic criteria have been

established by international classification of headache disorders (see Box 1)³ and a Rome III criterion for functional gastrointestinal disorders (see Box 2)⁴ was used in this case study. An idiopathic recurrent disorder seen mainly in children and characterized by episodic midline abdominal pain manifesting in attacks lasting 1 to 72 hours with normality between episodes. The pain is of moderate to severe intensity and is associated with vasomotor symptoms, nausea and vomiting.

Box 1
International Classification of Headache Disorders 2004 Criteria*
 Diagnostic criteria for abdominal migraine description

Diagnostic criteria	Response
A. At least five attacks fulfilling criteria B through D B. Attacks of abdominal pain lasting 1 to 72 hours C. Abdominal pain has all the following characteristics: 1. Midline location, periumbilical or poorly localized 2. Dull or "just sore" quality 3. Moderate or severe intensity D. During abdominal pain, at least two of the following: 1. Anorexia 2. Nausea 3. Vomiting 4. Pallor E. Not attributed to another disorder; history and physical examination do not show signs of gastrointestinal or renal disease, or such disease has been ruled out by appropriate investigations * Adapted from Oleson. Cephalalgia. 20043.	

Box 2
Rome III Functional Gastrointestinal Disorders 2006 Criteria*
 Diagnostic criteria for abdominal migraine include all of the following, with 2 or more episodes in the preceding 12 months:

Diagnostic criteria	Response
A. Paroxysmal episode of intense, acute periumbilical pain that lasts 1 hours or more. B. Intervening periods of usual health lasting weeks to months. C. The pain interferes with normal activities. D. The pain is associated with 2 or more of the following: a. Anorexia. b. Nausea. c. Vomiting. d. Headache. e. Photophobia. f. Pallor. E. No evidence of an inflammatory, anatomic, metabolic, or neoplastic process. * Adapted from Rasquin, A et al. Gastroenterology. 20064.	

A CASE

Miss MA, 12 year's girl, student of grade 7th, was brought by her parents to an outpatient of Kulsum International Hospital clinic referred by the family physician. They also brought all previous investigation of her including lab reports, X-ray report, Ultrasound report and other relevant findings of different speciality. She consulted General Physician, Gynaecologist, paediatrician, urologist and gastroenterologist. They did not report any significant physical illness and their findings suggested the possibility of "Functional disorder"

The participant informed consent²⁰ was obtained when she was selected for this case study.

She reported that she has severe abdominal pain, nausea and vertigo for the last five months and sometimes has episodes of headache. She couldn't eat properly and has lost weight gradually and became mildly pale. She could not go to school and also was not able to perform routine activities at home. Furthermore from the collateral history her parents reported that she easily got angry when something happened against her will. She had poor tolerance level, was easily frustrated and mostly anxious particularly when she went to school. She presumes the consequences before she acts upon something.

She was born in time through caesarean procedure. However, she had achieved all developmental milestones at normal age and went to school in time. She did not report any major illnesses or accidents. Any physical or sexual abuse was also not reported. She lived with her parents in a joint family system. She had one brother and one sister and she was in the middle by birth order. She got on well with her parents and siblings and did not report history of psychiatric disorder or addiction in her family. She was found to be quite, poor communicator and lacked eye contact. She was quite restless also. However her speech was of normal volume and was monosyllabic at times. The content lacked emotions and she seemed quite detached. There were no psychotic elements in the conversation. She denied any change in her mood, auditory or visual hallucinations and paranoid ideations. Clinical interview and integrated medical evaluation found her history to be consistent with diagnosis of abdominal migraine. After a brief Psychiatric Interview, the following psychological instruments were used to determine the possibility of psychiatric disorder..

1. Questionnaire about headache and abdominal pain.

This questionnaire is adapted from Abu-Arafah. Archives of disease in childhood, 1995⁷, it is used for the duration and extent of the headache or abdominal pain (see table 1 for details).

Table 1
 Question relating to headache and abdominal pain

Question	Response
Headache	
A. Has your child had headache over the past years?	Two months ago
B. If yes, were any of these severe enough to stop normal activities?	
C. If yes, how many times has she had severe headache in past years?	Some times daily or sometimes after two days
D. Was there a cause for each of these severe headache?	There was no obvious reason
E. If yes, what was the cause for each?	No obvious reason was there
Abdominal Pain	
A. Has your child had tummy ache over the past year?	Is the last two months
B. If yes, were any of these severe enough to stop normal activities?	She can not do normal activities
C. If yes, how many times has she had severe tummy ache in the past year?	
D. Was there a cause for each of these severe tummy aches?	No obvious reason
E. If yes, what was the cause for each?	There was no obvious reason

2. Human Figure Drawing (HFD).

It is a projective test used widely for personality assessment. It is easy to administer particularly with children. It was devised by Karen Machover²¹. However, the psychometric properties are the same as other projective test and have been used in the clinical settings to investigate the individual emotional problems²². Human figure drawings has been widely used as a projective personality test and has been primarily exploring the individual self perception²³ However, many psychologists believe that drawings may not be assessed fully without due consideration of the associated information secured through verbalization.

3. Coloured Progressive Matrices (CPM).

It was developed for use in various places to, cover the widest possible range of mental maturity and to be equally useful with subjects regardless of age, education, nationality or physical condition²⁴.

4. Childhood Depression Inventory 2 (CDI 2).

self-report inventory for measuring of symptoms of depression in child and adolescents. It was developed by Maria Kovacs²⁵.

5. The Revised Children's Manifest Anxiety Scale (RCMAS).

inventory developed by Reynolds and Richmond²⁶. It used to assess symptoms and severity of anxiety in children and adolescents.

Table 2
Diagnostic Data

Tests	Raw scores/percentile	Range
CPM	25 th -75 th	Intellectual average
CDI	27	Mild
RCMAS	07	No problem
HFD	-	-

Note: Human Figure Drawing

On HFD, in conjunction with other evidences the hypotheses derived from the drawings may be found relevant to the present complaints reported in this case study. Ms MA drew a small figure of a boy in the centre of a page, which indicated gender identification conflict, feelings of ineffectiveness, self centeredness and regressive tendencies. On examining the figure, she omitted some important parts such as hair and ears which reflected that she had the inclination of incompatibility with the social norms and maladjustment and low physical vigour²⁷. The general consideration for the usually drawn head frequently linked with control of impulses, emotions and the capability to socialize. In this case study she drew large head comparatively to the body, which showed poor emotional and social adjustment and inflated ego. In addition, she has mentioned buttons with an emphasis in the midline of the figure suggesting the infantile and somatic preoccupation²⁸ and body consciousness²⁹. The pupil omitting and closed eyes suggested an introversion/ self absorbed tendency. The truncated nose and squared shoulder indicated hostility toward authority figures and

thin neck showed the general physical weaknesses²⁹.

Post treatment report:

Ms MA was treated with EEG neurofeedback therapy, she attended three sessions, after three sessions she had reported improvement in her abdominal migraine symptoms. Ms MA had been discharged, after two years she was rechecked for the possibility of abdominal migraine symptoms. Brief Psychiatric Interview, comprehensive Psychological tests battery result and collateral finding did not report any symptoms of abdominal migraine.

Table 3
Pre and Post condition

PreEEG Neurofeedback Therapy		
Tests	Raw scores/percentile	Range
CPM	25 th -75 th	Intellectual average
CDI	27	Mild
RCMAS	07	No problem
Rome III*	Symptoms present	
ICHD**	Symptoms presents	
HFD	-	-
After EEG Neurofeedback Therapy		
Tests	Raw scores/percentile	Range
CPM	25 th -75 th	Intellectual average
CDI	20	Normal
RCMAS	06	No problem
Rome III*	No symptoms	Normal
ICHD**	No symptoms	Normal
HFD	-	-

*Rome III Functional Gastrointestinal Disorders 2006 Criteria adapted from Rasquin, A et al. Gastroenterology. 2006³

**International Classification of Headache Disorders 2004 Criteria adapted from Olesen. Cephalalgia. 2004⁴

Table-3 shows the pre and post EEG neurofeedback therapy result. Results revealed significant improvement between pre conditions to post condition of abdominal migraine.

Table 4
Post EEG Neurofeedback Therapy result

After EEG Neurofeedback Therapy		
Tests	Raw scores/percentile	Range
CPM	25 th -75 th	Intellectual average
CDI	20	Normal
RCMAS	06	No problem
Rome III*	No symptoms	Normal
ICHD**	No symptoms	Normal
HFD	-	-

Table-5

After 2 years of EEG Neurofeedback Therapy		
Tests		
CPM	25 th -75 th	Intellectual average
CDI	15	Normal
RCMAS	05	No problem
Rome III*	No symptoms	Normal
ICHD**	No symptoms	Normal
HFD	Normal	Normal

*Rome III Functional Gastrointestinal Disorders 2006 Criteria adapted from Rasquin, A et al. *Gastroenterology*. 20064.

**International Classification of Headache Disorders 2004 Criteria adapted from Oleson. *Cephalalgia*. 20043.

Table-4 shows the post EEG neurofeedback therapy result, the result shows that there is no evidence of psychiatric or abdominal migraine symptoms.

DISCUSSION

In this case report we investigated the efficacy of EEG neurofeedback therapy in the treatment of abdominal migraine. Treatment options compatible to Pakistani society and cultural norms were explored in this case study³⁰. The possibility of talk therapy was found unsuitable due to the non availability of confidential and non judgmental therapeutic environment, where it is hard in some cases that the parents want to be present during therapeutic sessions, and the client has no opportunity to explore her problem independently³¹. In this type of situation, the individual suffering from psychological disorders particularly, when there is some link with the home environment cannot express their ideas or thoughts explicitly and manifest psychosocial stresses in the form of physical symptoms. So, EEG neurofeedback therapy is a non-invasive treatment method¹⁸ which is effective and non threatening way of treatment for various psychological and behavioural problems¹⁷. Ms MA was treated with EEG neurofeedback therapy for a total six sessions including three consecutive sessions of Neurofeedback, where she showed improvement in her abdominal migraine symptoms. She was reassessed through international classification of headache disorders, Rome III criteria for functional gastrointestinal disorders and Comprehensive psychological assessment but she reports no more symptoms and has continued her study. After two years of gape, Ms MA was contacted to check her for relapse symptoms but after passing two calendar years she reports no recurrent symptoms of abdominal migraine and she reported that she is living normal life without any previous complain.

CONCLUSION

This case report demonstrates that EEG neurofeedback therapy has been used for the treatment of abdominal migraine without consuming psychotropic drugs. This method of treatment has been found effective in the treatment of abdominal migraine.

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