

Panic Disorder: Electroencephalographic and Echocardiographic Study

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Twenty five patients diagnosed as panic disorder according to DSM-IV criteria and 10 healthy subjects matched by age and sex with patients as control were studied using surface electrode EEG and two dimensional echocardiogram.

The aim was to detect any significant cerebral dysrhythmia from one hand and or any evidence of mitral valve prolapse on the other hand. This may help in understanding the relationship of panic disorder to cerebral or cardiac pathophysiology. The results of this study showed that:- Abnormal EEG in 52% of patients and 30% of control ($p < 0.05$). This abnormality was either generalized cerebral dysrhythmia; 12% in patients and 20% in control ($P > 0.05$), 50% of the focal dysrhythmia came from right temporal lobe.- Definite signs of MVP was found in 12% of patients and 10% of control while in 8% of patients and 10% of control the signs are only suggestive of MVP ($P > 0.05$).

Conclusion:- Although cerebral dysrhythmia was not significantly different in patient than control their propensities in right temporal lobe warrant special attention to their relationship to the emotional and/ or cognitive component of panic disorder, this could be a future large scale study.- The presumed special relationship between MVP and panic disorder is not supported by our study.

(Egypt. J. Psychiat., 1997, 20 : 141- 149).

Introduction

Panic disorder and epilepsy share a common cortical and autonomic symptoms. Many patients with panic disorder have been noted to experience transient sensory, cognitive, and emotional phenomena similar to those occurring in individuals with complex partial seizures (Boulenger et al, 1985). On the other hand the paroxysms of fear and autonomic nervous system hyperactivity experienced by some patients with partial seizures may closely resemble panic attacks (Weilburg et al., 1987).

Edlund et al (1987) stated that panic attacks were usually associated with se-

vere derealization and sometimes with severe autonomic symptoms; they reported EEG abnormalities in the temporal lobes either the non dominant one or both. In one study, association between panic disorder and of seizures had been proved (Neugebauer et al ,1993).

A patient with a temporal lobe focus might develop fortuitous limbic pathways from sensory association cortices through a hyperactive amygdala into the hypothalamus. The activation of these "hyperconnections" could then lead to the experience of fear with autonomic arousal (Goor et al 1981).

During the interictal period previously neutral stimuli would be paired with dysphoric feelings and autonomic discharges, leading to specific phobias or the syndrome of agoraphobia (Weilburg et al., 1987).

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Anxiety, panic attacks and neurotic behaviour are often considered to be components of the mitral valve prolapse syndrome (Szmullowicz et al, 1980. Crowe et al, 1982).

Kantor et al, (1980) hypothesized that palpitations induced by mitral valve prolapse lead to panic attacks that may progress to frank agoraphobia in patients with premorbid psychological vulnerability.

The increased demands placed on their cardiovascular systems by anxiety may precipitate mitral valve prolapse in patients who have an anatomic vulnerability of the mitral valves (Coplan et al, 1992).

However, whether the two syndromes i.e. panic and MVP are identical, separate and distinct, or to a variable degree overlap still remains a matter of debate (Libertheson et al, 1986).

The aim of this work is to study EEG pattern in patients with panic disorder this may sort out the controversy of the relationship between symptoms of panic disorder and epilepsy. Also to study the relationship between panic disorder and mitral valve prolapse, this may clarify if this kind of relationship do exist or not.

Subjects and Methods

This study was carried on 25 patients diagnosed as panic disorder according to DSM-IV criteria together with 10 healthy control subjects matched with patients by age and sex. The study was done in the neuropsychiatry and cardiology departments of Tanta university Hospital.

Patients and control cases were subjected to:

1- Clinical Neuropsychiatric and physical examination for the patients to make sure that they fulfilling the diagnostic criteria of panic disorder and for control cases to make sure that they are healthy.

2- EEG Study:

All the subject undergone-EEG (surface electrode recording). Electrode placement according to 10/20 system and utilizing scalp to scalp and referential montages. Recording were done during wakefulness and undergone two dimensional echocardiography with special emphasis on the presence of mitral valve prolapse.

3- Echocardiographic Study:

All the subject undergone two dimensional echocardiography with special emphasis on the presence of mitral valve prolapse. To assure accurate diagnosis of mitral valve prolapse; only tracings of the mitral valve made with the beam perpendicular to the chest wall or angled cephalic.

Two criteria were required for definite diagnosis of mitral valve prolapse: (Perloff et al, 1986).

1- Marked superior systolic displacement of mitral leaflets with coaptation point at or superior to annular plane.

2- Mild to moderate superior systolic displacement of mitral leaflets with:

- Chordal rupture.
- Doppler mitral regurgitation.
- Annular dilatation.

The criteria for suggestive prolapse included (Perloff et al, 1986).

1- Isolated mild to moderate superior systolic displacement of the posterior mitral leaflet.

2- Moderate superior systolic displacement of both mitral leaflets.

- Ten patients (40%) showed focal activity, (16%) paroxysmal and 24% non paroxysmal.

- Three patients (12%) showed generalized paroxysmal activity.

- One control (10%) showed focal paroxysmal activity.

- Two controls (20%) showed generalized paroxysmal activity.

- There was no significant difference between patients and controls.

Results

I- Demographic findings:

Table 1
Demographic Data in Patients and Control Cases

Item	Patients =N		Control =N	
Age:				
Mean	30.2		30.4	
SD	7.02		5.83	
Sex	No	%	No	%
Male	9	36	3	30
Female	16	64	7	70
Marital Status				
Married	20	80	8	80
Single	3	12	1	10
Widow	1	4	1	10
Divorced	1	4	0	0
Educational Level				
Read & Write	2	8	1	10
General Education	15	60	7	70
University	8	32	2	20
Occupation				
Professional	1	4	1	10
Non skilled worker	7	28	1	10
Student	2	8	1	10
House wife	14	56	6	60
Unemployed	1	4	1	10

II- Clinical Study:

Table 2
Frequency of Symptoms in the Studied Patients

Symptom	No of patients having that symptom	%
Fear of dying	25	100
Palpitation	25	100
Shortness of breath	23	92
Parathesia	16	64
Hot flushes	15	60
Sweating	13	52
Derealization	13	52
Nausia	13	52
Chills	11	44
Abdominal distress	10	40
Chest pains or discomfort	8	32
Choking	8	32
Trembling or Shaking	8	32
Depersonalization	6	24
Fear of being Crazy	6	24
Feeling dizzy, Unsteady	3	12

Table 3
Summary of Clinical Presentation of the Studied Patients

Item	Range	Mean	SD
Age at onset in years	18-42	28.72	6.41
Duration of illness in months	03 - 48	18.16	15.17
Usual duration of Panic Attack in minutes	10 - 30	18.2	6.75
Usual Frequency of panic attacks/ month	06 - 11	8.32	1.77

III- EEG Study:

Table 4
EEG Abnormalities in Patients and Controls

Activity	Patients	(25)	Controls	(10)	P
	NO.	%	NO.	%	
- Paroxysmal					
Focal	4	16	1	10	0.39
Generalized	3	12	2	20	0.32
- Non paroxysmal					
Focal	6	24	0	0	0.1
Generalized					
Total	13	52	3	30	

Fifty percent of focal abnormalities found in Rt. temporal lobe and in 10% focal abnormalities are bitemporal, the temporal lobe is involved with the frontal lobe in 20% of the patients. So the right temporal lobe is involved in 80% of cases.

Three patients (12%) were found to have definite mitral valve prolapse and two patients (8%) were found to have suggestive signs. As regards the controls only one subject (10%) was found to have definite prolapse and another one (10%) had suggestive signs of prolapse.

Table 5
Localization of the focal EEG Abnormalities in Patients Versus Controls

Site	Patients	(25)	Controls	(10)
	NO.	%	NO.	%
Rt. temporal	5	50	00	00
Rt. frontal	1	10	00	00
Rt. fronto- temporal	2	20	00	00
Bi temporal	1	10	00	00
Bi frontal	1	10	00	00
Lt temporal	00	00	1	100

Statistically, there was no significant difference between patients and controls with definite mitral valve prolapse with

exclusion of those with suggestive signs.

Discussion

The biological basis of panic disorder

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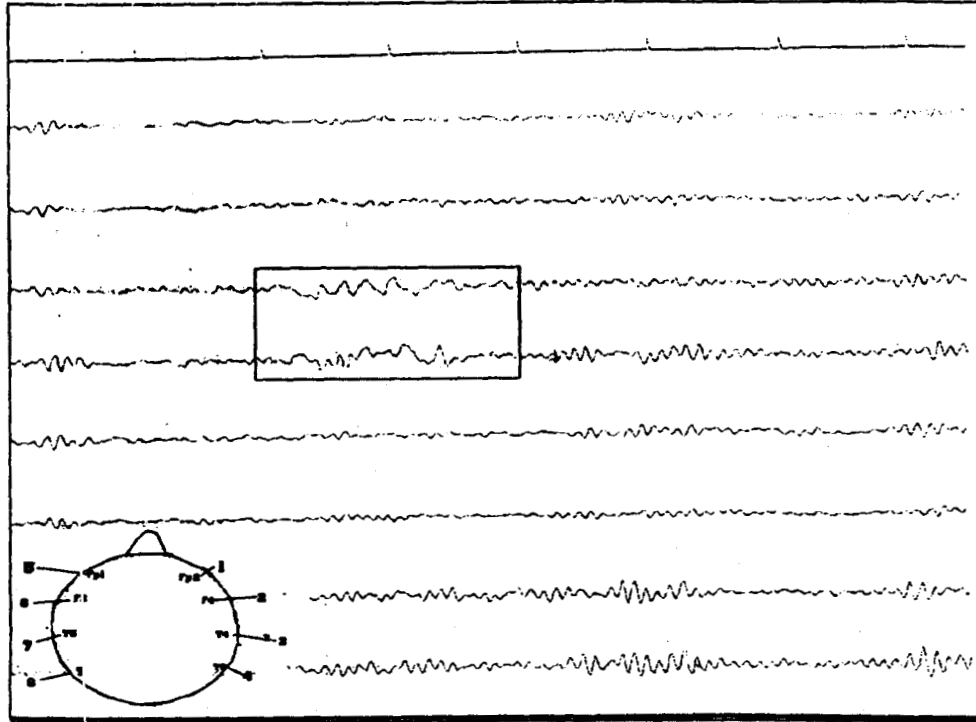


Fig. (1) right temporal delta theta in 25 years old male with recurrent panic attacks.

Echocardiographic Study:

Table 6
Mitral Valve Prolapse in Patients and Controls

	Patients		Controls	
	NO.	%	NO.	%
Definite	3	12%	1	10%
Suggestive	2	8%	1	10%

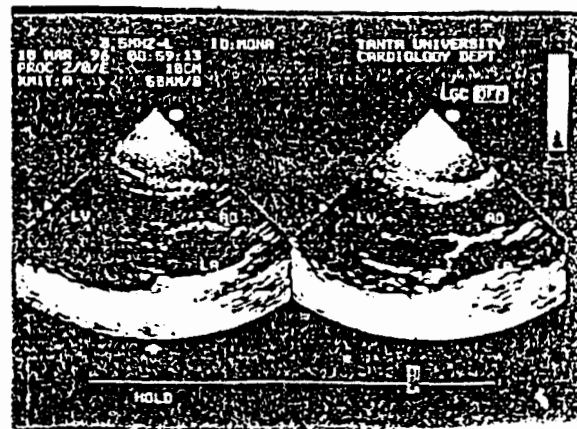
was a matter of researches since long time (Penfield and Jasper (1954), these studies included biochemical, neuroimaging and neuropsychological methods aiming to sort out the nature of this basis (Khan & Van Paarg, 1992).

This study demonstrated EEG changes in 52% of panic disorder patients and 30% of control cases. Although patients did not show significant increase in EEG changes; however looking at the nature of these changes may highlight some important notes.

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Fig (2) 30 years old male with recurrent panic attacks showed echocardiographic findings of definite MVP



The rate of paroxysmal activities is the same or even less in patients than control group 28%, 30% respectively, this indicates that panic attacks is not strongly related to or associated with paroxysmal cerebral dysrhythmia and it is far from being related to epilepsy specially if we consider that focal non paroxysmal dysrhythmia was reported in 24% of patients. This notion does not support the suggestions and explanations of some previous authors (Stern et al 1934), (Wellburg et al, 1987).

The location of most of EEG abnormalities; either paroxysmal or non paroxysmal; in the right temporal lobe (the right temporal lobe involved in 80% of EEG abnormalities) may support the role of the right temporal lobe dysfunction in the etiology of panic disorder. Previous studies on panic disorders demonstrated such dysfunction of the temporal lobe through positron emission tomography (Reiman et al, 1989), MRI studies (Fontaine et al, 1990) or brain electrical activity mapping (Abraham, 1986). Also Edlund et al (1987) reported EEG abnormalities in the temporal lobes, in patients with panic attacks. Gloor et al (1982) and Wall et al (1985) suggested that fear of panic attacks could be a result of temporo limbic stimulation or irritation. Confirming this findings through future work on a large number of patient that may permit correlation of EEG anomalies with symptoms of panic disorder may help in expiating the neuropsychological basis of symptoms.

Estimates of the prevalence of echocardiographic evidence of mitral valve prolapse (MVP) in the normal population range from 0.5% to 21% (Procacci et al. 1976). Others stated that MVP affects as much as 5% to 10% of the population (Savage et al 1983).

In our study MVP was detected in

20% of both patients and control group. Although this figure was within the range of general population it does not signify any specific relationship of mitral valve prolapse to panic disorder either as a cause or effect. This conclusion is going with many studies in this respect. Kantho et al (1980) found that only one of 18 patients (6%) with panic disorder in a psychiatric referral population had mitral valve prolapse. Shear et al (1984) found only 8% (two of 25) of patients with recurrent panic attacks had prolapse, approximately the prevalence in the general population. On the other hand Mazza et al (1986) stated that the prevalence of anxiety disorders in patients with mitral valve prolapse. Hartman et al 1982 found a prevalence of panic disorder is similar to that estimated for the general population among subjects with mitral valve prolapse. For all these reasons the previous studies about any relationship between panic disorder and MVP are still controversial.

References

- Abraham, ND (1986): Do psycho stimulants kindle panic disorder. *Am J psychiatry*. 143: 1627.
- Boulenger, JP, Bierer, LM, and Uhde, TW (1985) Psychosensory phenomena in panic and affective disorders in biological psychiatry 1985 Edited by Shagass C, Josiasah RC, and Bridger WH. *New York, Elsevier*, 1986.
- Coplan, JD, Papp, IA, King, DL, and Gorman, JM (1992) Amelioration of mitral valve prolapse after treatment for panic disorder. *Am J Psychiatry* 149: 1587.
- Crowe, RR, Gaffney, G and Kerbey, R (1982) Panic attacks in families of patients with mitral valve prolapse. *J Affective Disorder*, 4:121.

- Edlund, MJ, Swan, AC, and Clothier, J (1987) Patients with panic attacks and abnormal EEG results. *Am J Psychiatry*, 144: 508.
- Fontaine, R., Broton, G. Dery, R., Fontaine S., Elie R. (1990) Temporal lobe abnormalities in panic disorders, an MRI study, *Biol. Psychiatry* 27: 304.
- Gloor, P, Oliver, A, and Quesney, LF (1981) The role of amygdala in the expression of psychic phenomena in temporal lobe epilepsy, in the amygdaloid complex. Edited by Ber- Ari Amsterdam. Elsevier/ North Holland.
- Gloor, P, Oliver, A, and Quesney, LF (1982) The role of the limbic system in experiential phenomena of temporal lobe epilepsy. *Ann Neuro*, 12: 129.
- Hartman, N, Kramer, R, and Brawn, WR (1982) Panic disorder in patients with mitral valve prolapse. *Am J Psychiatry*, 139: 669.
- Kantor, JS, Zitrin, CM, and Zelidis, SM (1980) Mitral valve prolapse syndrome in agoraphobic patients. *Am J Psychiatry*, 137:467.
- Katho, RG, Noyes, R, and Slyman, D (1980) Propranolol in chronic anxiety disorders. *Arch Gen Psychiatry*, 37: 1361.
- Khan, RS, Van Paarg, HM (1992) Panic disorder, Biological prospectives. *Eur. NeuroPsychopharmacol*, 2:1.
- Liberthson, R, Sheehan, D.V, King, M.E, and Weyman, A.E. (1986) The prevalence of mitral valve prolapse in patients with panic disorders. *Am J Psychiatry*, 143: 511.
- Mazza, DL, Martin, D, Spacaventol, Jacobsen J, and Gibbs, H (1986) Prevalence of anxiety disorder in patients with mitral valve prolapse. *Am. J Psychiatry*, 143: 349.
- Neugebauer, R, Weissman, MM, and quellette, R (1993) Comorbidity of panic disorders and seizures: Affinity or Artifact? *J. Anxiety Disord*, 7:21.
- Perfied, W and Jasper, H. (1954) Epilepsy, and the functional anatomy of human brain, little Brown, Boston.
- Perloff, J.K., Child J.S. and Edwards, J.E. (1986) New guidelines for mitral valve prolapse. *Am J Cradiol*, 57: 1124.
- Procacci, PM., Svrn, SV. & Hrieter, S, and Bryson, AL (1976) Prevalence of clinical mitral valve prolapse in 1,169 young women N Engl, *J Med*, 294: 1086.
- Reiman, EM., Raichle, ME and Robins, E (1986): The application of position emission tomography to the study of panic disorder. *Am J Psychiatry*, 143: 469.
- Savage, DD, Garrison, RJ, and Devereux, RB (1983) Mitral valve prolapse in the general population epidemiologic features. *Am. Heart J*, 106: 571.
- Shear, MK, Devereux, R.B, Fox, R.K, Mann JJ. and Frances, A, (1984) Low prevalence of mitral valve prolapse in patients with panic disorder. *Am J Psychiatry*, 141:302.
- Stern, TA and Murray, GB (1984) Complex-partial seizures presenting as a psychiatric illness. *J Nerv Ment Dis*, 172: 625.
- Szmullowicz, J and Flannery, JG (1980) Mitral valve prolapse syndrome and psychological disturbance. *Psycho-somatics*, 21: 419.
- Weilburg, JB, Bear, D.M, and Sachs, G (1987) Three patients with concomitant panic attacks and seizures disorders possible clues to the neurology of anxiety. *Am J Psychiatry*, 144: 1053.

Le Désordre de Panique: Une étude électro-encephalographique et échocardiographique

On a examiné 25 patients diagnostiqués comme "désordre de panique" "selon le" "DSM- IV" et 10 personnes normales par l'échocardiogramme et le EEG. Les but était de détecter le moindre de dyrythmie cerebral significatif, ou l'évidence de prolapsus mitral. Les résultats ont montrés que : 52% de patients et 30% du groupe témoin MVP ont un EEG abnormal a été confirmé 12% de patients et 10% du groupe témoin.

اضطراب الهلع: دراسة التخطيط الكهربى للمخ والموجات فوق الصوتية للقلب

أجريت الدراسة على ٢٥ مريضاً بالهلع شخصوا حسب الدليل التشخيصى والإحصائى الرابع الأمريكى وأيضاً ١٠ حالات أصحاء كعينة ضابطة متوافقة مع المرضى من حيث العمر والجنس حيث تمت دراسة نشاط المخ الكهربائى والموجات فوق الصوتية للقلب وذلك بهدف بحث علاقة هذين العاملين ومرض الهلع ، هذا وقد أسفرت هذه الدراسة عن ما يلى :وجود اضطراب بالرسم الكهربي للمخ فى ٥٢٪ من المرضى مقابل ٣٠٪ فى العينة الضابطة كان الاضطراب عبارة عن اضطراب فى التواتر الكهربى المخى حيث كان عاماً فى ١٢٪ من المرضى و٢٠٪ فى العينة الضابطة وبؤبؤياً فى ٤٠٪ من المرضى و١٠٪ من العينة الضابطة من الملاحظ أن ٥٠٪ من بؤبؤ النشاط الكهربى وتركزت فى الفص الجببى الأيمن من المخ.

هناك علامات فى تصوير القلب بالموجات فوق الصوتية تدل على ارتخاء الصمام الميترالى بشكل أكيد فى ١٢٪ من المرضى و١٠٪ من العينة الضابطة وبشكل محتمل فى ٨٪ من المرضى و١٠٪ من العينة الضابطة.

الخلاصة:

على الرغم من أن اضطراب النشاط الكهربى للمخ لم يتم عن فروق ذات مدلول إحصائى بين المرضى والعينة الضابطة إلا أنه بالنظر إلى تركيز معظمه فى الفص الجببى الأيمن يساعد على خلق مجال لدراسات مستقبلية لعلاقة بين الفص الجببى واعراض مرض الهلع. لم تسفر الدراسة عن وجود علاقة ما بين ارتخاء الصمام الميترالى ومرض الهلع.