

FINGER PULSE VOLUME IN PATIENTS WITH PANIC ATTACKS

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To study the peripheral blood flow in patients with panic attacks during "Stress" conditions, nine patients with history of panic attacks were subjected to mental stress of arithmetic calculation and room-air voluntary hyperventilation. Finger Pulse Volume (FPV) was significantly altered during the period following mental activity in untreated patients when compared to controls and patients under treatment. There was also an increase in FPV in untreated patients at rest and during recovery after mental stress when compared to the treated patients.

Previous research has indicated that stress or anxiety associated with decrease in peripheral blood flow (Mathews & Lader, 1971). Smith and Houston (1984), have evaluated Finger Pulse Volume (FPV) as a measure of anxiety in response to a social-evaluative threat. Bloom *et al.* (1977) have shown that FPV or digital vasoconstriction is a valid measure of anxiety in response to threat of shock. We evaluated FPV in patients with panic attacks during "basal" and "stress" conditions. Mental arithmetic and room-air voluntary hyperventilation were chosen as stressors to evoke anxiety.

MATERIAL AND METHODS

Seven controls (5 men and 2 women) and nine patients (8 men and 1 women) - 5 drug free and 4 under active treatment with beta blockers (40mgm/day) diagnosed as having generalised anxiety disorder (GAD) with history of panic attacks satisfying the DSM-III R criteria were recruited from S.R.M.C. & R.I. for the study. The healthy volunteers were age and sex matched to the patients. Informed consent was obtained from all the patients.

FPV was recorded by means of a Medicare Polywrite with Pulse transducer attached to the palmar surface of the distal phalanx of the subject's middle finger on the nondominant hand. Simultaneously respiratory recordings were taken using a respiratory transducer. The recordings were continued throughout the period of observation till FPV returned to the basal value. After baseline recording, the controls and the patients were subjected to two minutes of stressful mental arithmetic (Kelly, 1966). For hyperventilation studies the same group of subjects were used. After a period of rest (30 minutes), they were made to hyperventilate room air for one minute. FPV was quantified by measuring the area under the curve of 7 equidistant pulse spikes with the aid of a planimeter.

RESULTS

None of the patients panicked during period of stress. One way ANOVA of the FPV of controls during rest, mental activity and recovery shows a significance ($F = 3.962, p < 0.05$). FPV in patients under treatment also showed a similar pattern ($F = 4.85, p < 0.05$). However, FPV in

untreated patients did not differ during rest, mental activity and recovery ($F=0.275$). When the FPV of three groups of subjects were analyzed, it was found that there was a significant difference at rest ($F=4.77, p<0.05$), mental activity ($F=4.77, p<0.05$) and recovery ($F=4.164, p<0.05$). However, Tukeys

patients when compared to the controls ($p<0.05$) during recovery. Tukeys test also revealed an increase in FPV in untreated patients at rest and during recovery compared to the treated patients ($p<0.05$).

**Table-1 : Mental arithmetics (MA)
One way ANOVA**

	Rest	MA	Recovery	
Controls (7)	0.68	0.32	0.66	$F=3.962, p<0.05$
Patients Treated-(4)	0.25	0.12	0.4	$F=4.85, p<0.05$
Patients Untreated (5)	1.34	0.54	1.46	$F=0.276, NS$
$F=4.77, F=4.77, F=4.164$ $p<0.05, p<0.05, p<0.05$				

**Table-2 : Hyper Ventilatio (HV)
One way ANOVA**

	Rest	MA	Recovery	
Controls (7)	0.68	0.39	0.64	$F=5.20, p<0.05$
Patients Treated-(4)	0.25	0.17	0.28	$F=0.367, NS$
Patients Untreated (5)	1.34	0.98	1.38	$F=0.631, NS$
$F=4.77, F=2.21, F=5.589$ $p<0.05, NS, p<0.05$				

Table-1 : Tukey's test

	Rest	MA	Recovery
Controls vs. Patients treated	NS	NS	NS
Controls vs. Patients untreated	NS	NS	$p<0.05$
Patients treated vs. untreated	$p<0.05$	NS	$p<0.05$

Table-2 : Tukey's test

	Rest	MA	Recovery
Controls vs. Patients treated	NS	NS	NS
Controls vs. Patients untreated	NS	NS	$p<0.05$
Patients treated vs. untreated	$p<0.05$	NS	NS

test for multiple comparison showed a significant increase in FPV only in the untreated

One way ANOVA of the FPV of controls at the rest, hyperventilation and recovery

showed a significance ($F = 5.2$, $p < 0.05$), whereas neither the treated patients nor the untreated patients showed any detectable change during rest, hyperventilation and recovery. When the FPV at rest during recovery of the three groups were analyzed it was found to be significant ($F = 4.77$, $F = 5.589$, $p < 0.05$). The F test did not reveal any significance in any of the groups during hyperventilation ($F = 2.21$). Tukeys test points out a significant decrease in FPV only in the untreated patients compared to the treated patients ($p < 0.05$).

DISCUSSION

While our results must be interpreted with caution in light of the small number of subjects evaluated, some initial conclusions may be entertained. Basal sympathetic activity is altered in drug - free patients and it falls much below the basal value in patients who are under active treatment. The decrease in FPV during mental activity was common for controls, treated and untreated patients. It is known that the blood flow to the skin is reduced through sympathetic activity and circulating epinephrine and non-epinephrine. FPV came back to near normal in all the three groups

during recovery, but the magnitude differed. FPV was significantly altered during the period following mental activity in untreated patients when compared to controls and patients under treatment. In addition to changes in FPV, the untreated patients also showed significant increase ($p < 0.001$) in the number of apnoeic periods following hyperventilation when compared with controls and treated patients (not reported here), indicating delayed recovery in this group of subjects. The results suggest that FPV may be used as state marker for patients with history of panic attacks. Whether FPV can be used as a diagnostic or prognostic index has to be further evaluated.

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