

FINGER-PULSE VOLUME DURING CO₂ - INDUCED PANIC STATES

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Changes in Fingure-Pulse Volume (FPV) during CO₂ inhalation were studied in patients diagnosed as having Anxiety disorder with history of panic attacks. Waxing and Waning of the FPV was observed in all the cases after CO₂ inhalation, and this pattern was significantly intensified during panic attacks during the study. The significance and the mechanism underlying the same is discussed.

Breathing air supplemented with CO₂ is known to induce panic in patients with panic anxiety (Hout, 1984). Since it is well established that peripheral vasoconstriction is a valid physiological index of anxiety (Bloom *et al.*, 1976). We undertook a study to evaluate the FPV during CO₂ - induced panic states.

MATERIAL AND METHODS

6 patients diagnosed as having Anxiety Disorder with history of panic attacks, satisfying the DSM-III R criteria were recruited for the study. All patients were in good general medical health, and were drug-free for one month. Written informed consent was obtained from all the patients. They were rated by the Hamilton Anxiety Scale, and Acute Panic Inventory. The FPV tracings were recorded by means of a photo electric pulse transducer in a medicare polyrite as described by Smith *et al.* (Smith *et al.*, 1984), 5% CO₂ was administered through a nasal catheter. When panic symptoms were reported, the administration of CO₂ was immediately discontinued, and the recording continued till baseline was reached. If panic symptoms were not experienced after 15 minutes of CO₂ inhalation, the flow was terminated, and the recordings continued till the

baseline was reached. From the recorded pulse tracings, the ratio of the amplitude of waxing and waning periods were calculated and expressed as FPV ratio.

The data was analysed by student 't' test.

RESULTS

4 out of 6 patients panicked during the procedure. The FPV ratio before and during the panic attack in panickers was found to be statistically significant ($p < 0.05$) (Table-I).

Table-I : FPV Ratio - In Panickers

	Before CO ₂ (n=4)	After CO ₂ (n=9)
Mean±SEM	0.5175±0.133	0.345±0.075*

* $p < 0.05$

DISCUSSION

CO₂ is known to induce panic activating the locus coeruleus neurons (Elam, 1981). soon

after CO₂ administration, we found a waxing and waning pattern in the FPV recording. In the non-panickers, this pattern continued till the end of 15 mt. period of CO₂ inhalation. In the panickers, there was an intensification of the waxing and waning pattern, and the ratio was statistically significant ($p < 0.05$). In all the patients (panickers and non-panickers) there was rebound increase in FPV after cessation of CO₂.

CO₂ activates the non-adrenergic mechanisms (Redmond, 1979) causing an increase in peripheral resistance. This might be responsible for the waxing phase. The baroreceptor mechanism produces a reflex vasodilation, leading to the waning phase of FPV. During panic, there is intensification of this pattern, evidencing more of noradrenaline release.

This panic response observed probably indicates an additional locus coeruleus pathology in a majority of anxiety patients. This is over and above the other pathophysiological processes observed in generalized Anxiety state. To establish this hypothesis further, one needs to study the FPV response to CO₂ in anxiety disorder without the history of panic attacks and in non-anxiety subjects.

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