INTRODUCTION:

This program is oriented towards researchers and clinicians in the Behavioral Sciences. Topics presented include: cardiovascular processes, brain processes, conditioning, behavior theory.

PRESIDENTIAL ADDRESS

The Functional Stability of the Nervous System:
A Biological Basis of Intelligence

H. D. KIMMEL

Abstract not available.

Thursday, November 18, 1982

PAPER SESSION I

MODERATOR: J. TURKKAN

Septum Discharges and Blood Pressure Control

O. ANDY, A. COWLEY, V. READ, AND D. PEELER

University of Mississippi Medical Center
Jackson, Mississippi

The objective of this investigation was to determine whether the limbic system can sustain a hypertensive state by way of directly activating the pituitary release of ACTH and ADH. Fourteen adult cats were utilized for the study. Mesencephalotomy was performed to prevent direct neuronal input from the limbic system to brainstem and spinal cord blood pressure controlling mechanisms. Bipolar electrodes were placed in the septum and after discharges were induced by electrical stimulation. Arterial blood pressure changes were correlated with the simultaneously recorded electroencephalographic changes.

Results

Pressor responses of 25–30 mm of Hg were correlated with after discharges lasting one minute or longer. There was a gradual elevation of both systolic and diastolic components. Blood cortisol and ADH were found to be elevated during and immediately after the termination of the discharges. Differential and total pituitary resection abolished the limbic induced arterial pressor and neuroendocrine responses. It was concluded that the limbic system may very well contribute to blood pressure control through activation of pituitary release of ADH, a known pressor agent. The activated release of ACTH as reflected by the cortisol response suggests a second mode through which the limbic system can exert chronic pituitary sustained neuroendocrine control of blood pressure.
Elicitation of Tonic Blood-Pressure Responding with a Synthetic Work Task

R. L. Ray and H. H. Emurian

Naturally elicited pressor episodes have been identified by some investigators as possible antecedents of chronic hypertension. One commonly proposed eliciting agent for such "naturalistic" blood pressure responding is sustained stress, such as work stress. In an attempt to develop a model of sustained-stress-elicited blood pressure responding, several studies were performed in which subjects were required to perform a synthetic work task, the multiple task performance battery (MTPB), while blood pressure and other psychophysiological variable were measured. The MTPB is computer controlled and consists of several concurrently presented subtasks, including mental arithmetic, probability monitoring, histogram matching, and signal detection. Subjects performing the MTPB for one hour exhibited a significant increase in mean blood pressure from baseline levels which did not diminish in magnitude over the session. This one-hour duration response was seen in both naive subjects and in subjects who had as much as 80 hours of previous practice with the task. The split-half correlation for blood pressure level during task performance was +0.95. In a second experiment subjects were presented with five five-minute task periods during each of two daily sessions. Task-elicited blood pressure elevations were seen for each trial of both daily sessions, and when response magnitude was defined as the difference in baseline blood pressure level from the initial baseline to each task period, no habituation of blood pressure response magnitude was observed. The test-retest correlation of average blood pressure response magnitude for the first and second session was +0.68. These findings indicate that the MTPB-elicited blood pressure response exhibits both within-session and between-session reliability and stability, and they suggest that the MTPB is a good tool for the study of long-term or tonic work-stress-elicited blood pressure responding.

Comparison of Hemodynamic Responses to Acute Coronary Occlusion in Awake vs. Sedated Dog

Steve R. Vallance, Thomas L. Skinner, George E. Billman, C. F. Knapp, and David C. Randall

Department of Physiology and Biophysics and Wenner Gren Laboratory
University of Kentucky, Lexington, Kentucky

The purpose of this experiment was to compare the effect of an acute coronary occlusion upon heart rate (HR), mean arterial blood pressure (BP), cardiac output (CO), Stroke Volume (SV) and total peripheral resistance (TPR) in awake dogs vs. the same animals after the administration of Innovar (0.05 ml/kg of a combination of 0.4 mg/ml fentanyl and 20 mg/ml droperidol). Innovar has a sedative and analgesic action, but does not produce anesthesia per se. The dogs were instrumented with arterial catheters, left ventricular pressure transducers, electromagne-

<table>
<thead>
<tr>
<th></th>
<th>Awake</th>
<th>Innovar</th>
<th>5x-Innovar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C</td>
<td>O</td>
<td>R</td>
</tr>
<tr>
<td>HR</td>
<td>80 ± 19</td>
<td>123 ± 33</td>
<td>91 ± 21</td>
</tr>
<tr>
<td>BP</td>
<td>101 ± 18</td>
<td>92 ± 15</td>
<td>94 ± 19</td>
</tr>
<tr>
<td>CO</td>
<td>100 ± 18</td>
<td>105 ± 18</td>
<td>104 ± 1</td>
</tr>
<tr>
<td>SV</td>
<td>100 ± 68</td>
<td>9 ± 8</td>
<td>91 ± 8</td>
</tr>
<tr>
<td>TPR</td>
<td>100 ± 84</td>
<td>8 ± 9</td>
<td>93 ± 9</td>
</tr>
</tbody>
</table>

TABLE 1.