

Do Not type

A. CARDIOVASCULAR

Garn

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Blood Pressure ^(BP) { during orbit ^{and} reentry }

Post flight

Background: Orthostatic hypotension has followed space flights & been ^{noted} present since Gemini

() ^{and} can be expected after ~~significant~~ exposures to ^{weightlessness} ~~14~~ of significant duration (days). The

problem arises from fluid shift ^{and} loss, from ^{peak} decreased metabolic loads, and ~~probably~~ from

neurological adaptation. ~~There~~ ^{There} had been sufficient concern

~~over~~ over hypotension during STS ~~entry~~ to ~~include~~ include anti-G suits. An extensive program

for evaluation of these suits during entry was planned but indefinitely delayed by ~~failure~~

failure of the custom-built blood pressure ^{apparatus} ~~and~~ other instrumentation. A commercial BP-HR ^{heart rate} recorder

was used in SMS studies on STS 7+8 () and coincidentally by one crewmember during

entry ^{with anti-gravity suit} ~~AGS~~ activation/deactivation on STS-8,
 After several ~~_____~~ near syncope
 on Shuttle ~~_____~~ following seat egress ~~_____~~ presumed
 to be orthostatic hypotension. ⁶ it was agreed
 to make a series of BP-HR studies during
 entry & egress. ^{Blood Pressure - Heart Rate measurements} BP-HR are considered definitive
~~measurements~~ for ^{orthostatic hypotension} (O.S. H.T.). This study ^{is} ~~_____~~
 a ~~_____~~ portion
 of this series.

^{Hardware} ~~Hardware~~ and ^{BP-HR} procedures: The recorder is an
 extensively tested ^{and} ~~to~~ used commercially available
 ambulatory unit modified only to the extent
 of ^{decreasing} ~~decreasing~~ minimum automatic sample time to
 3.5 ^{minutes} ~~mins.~~. ~~It~~ { It uses conventional cuff
 and K-sounds (Riva-Rocci techniques), ^{techniques} ~~techniques~~
 is completely automatic and is capable of
 recording and storing up to 200 lines

G-BP

Fig-1 Garm 2 Recorder (3)
-2 Digital BP record

of data (time, BP, and HR) internally. [REDACTED]

This data is then transferred to a standard digital format, ^{Fig. 2,} [REDACTED] and plotted on return to [REDACTED] earth by a companion data reduction unit.

Accuracy of the unit has been examined ^{reported on} by ^{and} [REDACTED] a number of investigators including the author who has used it ^{extensively} in ^{clinical} [REDACTED] and aerospace investigations.

The unit was repeatedly checked for accuracy by simultaneous comparison of its results ^{with} [REDACTED] manual determinations made ^{with} a calibrated sphygmomanometer. A

typical comparison is shown in ^{Table} [REDACTED] and analysis.

Results: ^{Blood pressure and heart rate} BP & HR were obtained ^{with} this

device pre-^{and} post flight on L-49 ^{and} R+1 and in flight on ^{mission days} MD 6 ^{and} 7.

The records were ~~examined~~ edited and artifactual values removed using standard criteria. Results were then plotted ~~on~~ and are shown in Figs. $\frac{3}{4}$ $\frac{5 \& 6}{5 \& 6}$. In addition, ^{the mean ~~& std. dev.~~ and standard deviation} several epochs were ~~averages~~ obtained and compared. Table $\frac{2}{2}$

Comments: The

Place marker & Info. needed for.

Blood Pressure

p1. Needed: Gemini ?

" : fluid shift and loss (?) peak metabolic loads (?)

" : SMS studies on STS 7 & 8 ()

p3. Fig 1. Gem $\bar{c}$ Recorder - please locate in text.

Fig 2. Digital BP record.

Table 1, comparison of automatic STS & manual sphygmomanometers

p4. Figs. 3, 4, 5, 6. BP & HR results

Table 2

Comments - to be written.