Ocular Outcomes Comparison Between 14- and 70-day Head-down Tilt Bed Rest

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BACKGROUND

• Ophthalmological changes have been recently reported in some astronauts involved in long-duration space missions:
  - Elevated intracranial pressure resulting from µG-induced cephalad fluid shifts may be responsible for most of these findings
  - Head-down tilt bed rest (HDTBR) produces cephalad fluid shifts; used to simulate the effects of µG on the human body

METHODS

• Experimental protocols:
  - 14-day HDTBR
  - 70-day HDTBR

RESULTS

<table>
<thead>
<tr>
<th>HDTBR Duration</th>
<th>Study Population</th>
<th>Ocular Exams</th>
<th>Methods</th>
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</thead>
<tbody>
<tr>
<td>14 days</td>
<td>14- and 70-day HDTBR in healthy human subjects.</td>
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<tr>
<td>70 days</td>
<td>Hypothesis: 70-day HDTBR induces ocular changes of greater magnitude as compared to 14-day HDTBR</td>
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PURPOSE

• To compare structural and functional ocular outcomes between 14- and 70-day HDTBR in healthy human subjects.

METHODS

• Two integrated, multidisciplinary studies conducted at NASA Flight Analogs Research Unit (FARU): 14- and 70-day 6º HDTBR

NASA bed rest studies STANDARDIZED CONDITIONS

- Subject to rest in bed at all times
- Monitoring by a subject monitor and an in room camera
- 24 hrs a day
- Daily measurement of vital signs, body weight, fluid intake and fluid output
- Monitoring of cospace participants (subject monitor and room camera)
- No napping permitted between 6:00 am and 10:00 pm

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- Standardized diet

RESULTS

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<thead>
<tr>
<th>14-day HDTBR</th>
<th>70-day HDTBR</th>
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<tbody>
<tr>
<td>Pre-BR</td>
<td>Post-BR</td>
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<td>Pre-BR</td>
<td>Post-BR</td>
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- Pre/post-HDTBR differences in near visual acuity, spherical equivalent, IOP and SD-OCT average RNFL thickness were compared between the two studies

CONCLUSIONS

• There were no significant pre/post-HDTBR differences between 14- and 70-day HDTBR for the structural and functional ophthalmological variables evaluated

SUPPORT

- NASA Flight Analogs Project, 516724.03.04.01

DISCLOSURE

Cromwell, RL None; Taibbi, G None; Zanello, SB None; Yarbough, PO None; Ploutz-Snyder, RJ None; Vizzeri, G None
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