Colonoscopy Screening in the US Astronaut Corps

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Background

- Historically, colonoscopy screenings for astronauts have been conducted to ensure that astronauts are in good health for space missions.
- This data has been identified as being useful for determining appropriate occupational surveillance targets and requirements.
- Colonoscopies in the astronaut corps can be used for:
  - Assessing overall colon health
  - A point of reference for future tests in current and former astronauts
  - Following-up and tracking rates of colorectal cancer and polyps.
  - Comparison to military and other terrestrial populations.
- In 2003, medical screening requirements for the active astronaut corps changed to require less frequent colonoscopies.
- Polyp removal during a colonoscopy is an intervention that prevents the polyp from developing into cancer and decreases the individual's risk for colon cancer.

Purpose

The objective of this study is to evaluate the possible effect of increased follow-up times between colonoscopies on the number and severity of polyps identified during the procedures among both current and former NASA astronauts.

Methods

- A retrospective study of all NASA astronauts, current and former, was conducted by review of the ISC Clinic Electronic Medical Record and Lifetime Surveillance of Astronaut Health (LSAH) database for colonoscopy screening procedures and pathology reports.
- The screening procedures included in the study varied, ranging from proctoscopy to proctosigmoidoscopy to colonoscopy, which are used to examine the colon to the rectum, sigmoid, or cecum respectively.

Discussion

As expected, follow-up intervals between colonoscopies were longer after the screening requirement change than before the change. Colonoscopies performed after the requirement change tended to have a higher incidence and greater severity of polyps. From pre-2003 to post-2003 the percentage of colonoscopy procedures yielding no polyps decreased from 83.77% to 74.70%. Not only did post-2003 procedures yield more polyp findings, but the polyps recorded were more often of severe pathology. 3.62% of pre-2003 colonoscopy findings were polyps of the hyperplastic type (the least severe polyp type) and only 3.35% were of greater severity. Post-2003, 4.21% of findings were hyperplastic polyps while 11.44% were of greater severity. Further statistical analysis needs to be done to confirm that these differences are indeed significant. The increased follow-up times offer an explanation to the increased polyp severity, since longer times between screening give polyps more time to develop.

Upon the investigation of other possible contributing factors to these results, we also found that post-2003, the mean age at colonoscopy was significantly higher than pre-2003. This study included both active, management, and retired astronauts. The astronaut corps is an aging population; the increased average age of astronauts could also be a contributing factor to the results, since the risk of developing polyps increases with age. In addition, known risk factors for colon cancer such as smoking, alcohol consumption, exercise, diet, personal and family history were not included in this analysis. Further work is needed to characterize the incidence of polyps in the US astronaut corps.

Mean Follow Up Intervals After Colonoscopy Pre and Post 2003

- One Sided Wilcoxon Rank Sum Test

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-2003</th>
<th>Post-2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Polyps</td>
<td>3.9 yrs</td>
<td>4.8 yrs</td>
</tr>
<tr>
<td>Polyps</td>
<td>2.2 yrs</td>
<td>3.3 yrs</td>
</tr>
<tr>
<td>Total</td>
<td>3.6 yrs</td>
<td>4.4 yrs</td>
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</tbody>
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References