

Hemorrhoids

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Contents

- 1 Introduction
- 2 Clinical Priority and Clinical Priority Rationale by Design Reference Mission
- 3 Initial Treatment Steps During Space Flight
- 4 Capabilities Needed for Diagnosis
- 5 Capabilities Needed for Treatment
- 6 Associated Gap Reports
- 7 Other Pertinent Documents
- 8 List of Acronyms
- 9 References
- 10 Last Update

Introduction

Hemorrhoids are congested blood vessels in the lower rectum. They may be sub-classified by anatomical location (internal or external) and whether they are complicated with bleeding, prolapse, strangulation, or ulceration.^[1] Most persons with hemorrhoids do not seek medical care and self-treat using non-prescription medications.^[2]

During space flight the risk for symptomatic hemorrhoids may be increased due to a higher incidence of constipation (thought to be explained by large bowel ilius), relative dehydration, and the preference of the crew to reduce bowel movements. Each of these factors may contribute to straining at stool which can increase the risk of developing or worsening of hemorrhoids. Therapeutic resources are available on board the International Space Station (ISS).^[3]

Clinical Priority and Clinical Priority Rationale by Design Reference Mission

One of the inherent properties of space flight is a limitation in available mass, power, and volume within the space craft. These limitations mandate prioritization of what medical equipment and consumables are manifested for the flight, and which medical conditions would be addressed. Therefore, clinical priorities have been assigned to describe which medical conditions will be allocated resources for diagnosis and treatment. “Shall” conditions are those for which diagnostic and treatment capability must be provided, due to a high likelihood of their occurrence and severe consequence if the condition were to occur and no treatment was available. “Should” conditions are those for which diagnostic and treatment capability should be provided if mass/power/volume limitations allow. Conditions were designated as “Not Addressed” if no specific diagnostic and/or treatment capability are expected to be manifested, either due to a very low likelihood of occurrence or other limitations (for example, in medical training, hardware, or consumables) that would preclude treatment. Design Reference Missions (DRMs) are proposed future missions designated by a set of assumptions that encompass parameters such as destination, length of mission, number of crewmembers, number of Extravehicular Activities (EVAs), and anticipated level of

care. The clinical priorities for all medical conditions on the Exploration Medical Condition List (EMCL) can be found here (https://humanresearchwiki.jsc.nasa.gov/index.php?title=Category:All_DRM). The EMCL document may be accessed here (https://humanresearchwiki.jsc.nasa.gov/images/6/62/EMCL_RevC_2013.pdf).

Design Reference Mission	Clinical Priority	Clinical Priority Rationale
Lunar sortie mission Assumptions: <ul style="list-style-type: none"> ■ 4 crewmembers (3 males, 1 female) ■ 14 days total ■ 4 EVAs/ crewmember ■ <u>Level of Care 3</u> 	Not Addressed	Hemorrhoids are an inconvenience to the affected crewmember, but aside from causing discomfort are of little clinical significance, and can be managed by non-pharmacological treatment. A crewmember with known hemorrhoids prior to the mission may elect to undergo hemorrhoidectomy before a long-duration mission or take specific medications as part of a personal medical kit. This condition is therefore not specifically addressed by the onboard medical kit.
Lunar outpost mission Assumptions: <ul style="list-style-type: none"> ■ 4 crewmembers (3 males, 1 female) ■ 180 days total ■ 90 EVAs/ crewmember ■ <u>Level of Care 4</u> 	Not Addressed	Hemorrhoids are an inconvenience to the affected crewmember, but aside from causing discomfort are of little clinical significance, and can be managed by non-pharmacological treatment. A crewmember with known hemorrhoids prior to the mission may elect to undergo hemorrhoidectomy before a long-duration mission or take specific medications as part of a personal medical kit. This condition is therefore not specifically addressed by the onboard medical kit.
Near-Earth Asteroid (NEA) mission Assumptions: <ul style="list-style-type: none"> ■ 3 crewmembers (2 males, 1 female) ■ 395 days total ■ 30 EVAs/ crewmember ■ <u>Level of Care 5</u> 	Should	Hemorrhoids are an inconvenience to the affected crewmember, but aside from causing discomfort are of little clinical significance. A crewmember with known hemorrhoids prior to the mission may elect to undergo hemorrhoidectomy before a long-duration mission or take specific medications as part of a personal medical kit. The likelihood of a crewmember with no previous history of hemorrhoids developing them during the mission is low. However, the resources needed to treat are either already manifested for treatment of other conditions, or would require minimal volume, mass, and training, and comfort on a long-duration NEA mission is important. Therefore, treatment should be manifested if mass/volume allow.

Initial Treatment Steps During Space Flight

A link is provided to a prior version of the International Space Station (ISS) Medical Checklist, which outlines the initial diagnostic and treatment steps recommended during space flight for various conditions which may be encountered onboard the ISS. Further diagnostic and treatment procedures beyond the initial steps outlined in the Medical Checklist are then recommended by the ground-based Flight Surgeon, depending on the clinical scenario. Please note that this version does not represent current diagnostic or treatment capabilities available on the ISS. While more recent versions of this document are not accessible to the general public, the provided version of the checklist can still provide a general sense of how medical conditions are handled in the space flight environment. Medical Checklists will be developed for exploration missions at a later point in time.

Please note this file is over 20 megabytes (MB) in size, and may take a few minutes to fully download.

ISS Medical Checklist (http://www.nasa.gov/centers/johnson/pdf/163533main_ISS_Med_CL.pdf)

Capabilities Needed for Diagnosis

The following is a hypothetical list of capabilities that would be helpful in diagnosis. It does not necessarily represent the current capabilities available onboard current spacecraft or on the ISS, and may include capabilities that are not yet feasible in the space flight environment.

- Anal speculum
- Lubricant
- Imaging capability (such as a camera)

Capabilities Needed for Treatment

The following is a hypothetical list of capabilities that would be helpful in treatment. It does not necessarily represent the current capabilities available onboard current spacecraft or on the ISS, and may include capabilities that are not yet feasible in the space flight environment.

Use of preventative strategies is best (sufficient water intake and fiber in diet). If hemorrhoids do occur, use:

- Hemorrhoidal cream
- Stool softener
- Antibiotics for superimposed infection
- Analgesics (non narcotic, oral)

Associated Gap Reports

The NASA Human Research Program (HRP) identifies gaps in knowledge about the health risks associated with human space travel and the ability to mitigate such risks. The overall objective is to identify gaps critical to human space missions and close them through research and development. The gap reports that are applicable to this medical condition are listed below. A link to all of the HRP gaps can be found here (<http://humanresearchroadmap.nasa.gov/Gaps/>).

- 2.01 - We do not know the quantified health and mission outcomes due to medical events during exploration missions.
- 2.02 - We do not know how the inclusion of a physician crew medical officer quantitatively impacts clinical outcomes during exploration missions.
- 3.01 - We do not know the optimal training methods for in-flight medical conditions identified on the Exploration Medical Condition List taking into account the crew medical officer's clinical background. (Closed)
- 3.03 - We do not know which emerging technologies are suitable for in-flight screening, diagnosis, and treatment during exploration missions.
- 4.01 - We do not have the capability to provide a guided medical procedure system that integrates with the medical system during exploration missions.
- 4.02 - We do not have the capability to provide non-invasive medical imaging during exploration missions.
- 4.07 - Limited wound care capability to improve healing following wound closure (Closed)
- 4.14 - We do not have the capability to track medical inventory in a manner that integrates securely with the medical system during exploration missions.
- 4.15 - Lack of medication usage tracking system that includes automatic time stamping and crew identification
- 4.17 - We do not have the capability to package medications to preserve stability and shelf-life during exploration missions.
- 4.24 - Lack of knowledge regarding the treatment of conditions on the Space Medicine Exploration Medical Condition List in remote, resource poor environments (Closed)
- 4.27 - We do not have the capability to sterilize medical equipment during exploration missions.
- 5.01 - We do not have the capability to comprehensively manage medical data during exploration missions.

Other Pertinent Documents

List of Acronyms

D	
DRM	Design Reference Mission
E	
EMCL	Exploration Medical Condition List
EVA	Extravehicular Activity
H	
HRP	Human Research Program
I	
ISS	International Space Station
M	
MB	Megabyte

N	
NASA	National Aeronautics and Space Administration
NEA	Near Earth Asteroid
U	
U.S.	United States

References

1. Thornton S. Hemorrhoids. Geibel J, editor. WebMD eMedicine. 1-7-2011. New York. 7-29-2011.
2. Everhart JE. Hemorrhoids. In: Everhart JE, editor. The Burden of Digestive Diseases in the United States. Washington DC: US Department of Health and Human Services, Public Health Service, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases ; 2008. p. 89-92.
3. Marshburn TH. Acute Care. In: Barratt M, Pool S, editors. Principles of Clinical Medicine for Space Flight. New York: Springer; 2008. p. 101-22.

Last Update

This topic was last updated on 8/12/2014 (Version 2).

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