

#1996 - Effects of vibration on urinary tract in military helicopter aviators

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Body

Abstract

Introduction: Eight major classic stresses influencing aircrew health include: Hypoxia, Thermal stress, Radiation, fatigue, vibration, noise, Air pressure changes, acceleration and gravitational factors. Continued exposure to whole-body vibration, considered to have high potential for producing bodily damage and increase complications such as abdominal cramping and solid organs (such as kidneys) disorders. While transient hematuria is typically benign, persistent or recurrent hematuria may be a sign of significant underlying urinary tract disease and must be fully evaluated in all aviators. This study set out to determine the incidence of hematuria and proteinuria before and after air duty, and influence of vibration on renal function in pilots.

Methods: Thirty aviators served as subjects. Urine samples in pre-flight, post-flight and 8 hour later were collected, and then macroscopic and microscopic evaluation was performed for screening hematuria and proteinuria.

Results: The obtained results help to understand changes in the human body induced by space flight factors. In none of three samples taken, microscopic hematuria was seen. Although the number of Red Blood Cell per high-power field was changed in pre- and post- flight urine samples, but it was not significant. The most striking result to emerge from

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the data is that in comparison between pre- and post- flight urine samples, the number of White Blood Cell per high-power field was significantly changed ($P < 0.031$), also the changes were significant in pre-flight sample and 8-hour later ($P < 0.018$). Interestingly, the amount of epithelial cells and mucus measured in the urine before and 8-hour after flight was significantly difference (in order $P < 0.14$, $P < 0.006$). Contrary to expectations, this study did not find a significant difference in proteinuria. It is also worth mentioning that vibration has been determined, which was $11-14/2 \text{ m/s}^2$ in different parts of helicopters. The findings from this study make several contributions to the current literature.

Conclusion: The data would seem to suggest that the mechanical stresses imposed on the body during vibration exposure can potentially lead to interference with bodily functions and tissue damages, depending on the frequency range and exposure conditions. This is an important issue for future research.

References

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