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BODY WEIGHT MAY PLAY A ROLE IN OCULAR PRESSURE IN SPACE: EVIDENCE FROM OBESITY STUDIES

Abstract

Purpose: Preflight body weight is a strong predictor of subsequent visual changes in spaceflight. Those who weigh more may have a more pronounced decrease in tissue compressive forces compared to those who weigh less. To understand the effect of body weight on the eye, we examined the effect of increased body weight on intraocular pressure on Earth.

Methods: We conducted a systematic review to summarize the relationship between weight parameters (including body mass index (BMI) and obesity indices), and intraocular pressure (IOP). We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. Study selection and data extraction were performed in duplicate using EMBASE, MEDLINE, and CENTRAL, from database inception to the second week of January 2019. All original retrospective, cross-sectional, and prospective cohort studies describing the effect of BMI on IOP were included. Cadaveric, animal, and radiographic studies were excluded. Studies on pediatric and geriatric populations were also excluded.

Results: A total of 60 individual studies (36 cross sectional studies, 17 prospective cohort studies, 4 case control studies, and 3 retrospective cohort studies), were included from the 1,364 studies eligible for title and abstract screening. The studies included 1,046,781 participants which had an average age of 46.0 (range, 14 - 100).

The average BMI was 25.9 (range, 20.1 - 48.8) and the average IOP was 14.9 mmHg (range, 11.6 - 27.8). A total of 75% (45/60) of studies found a statistically significant increase in IOP and/or primary open angle glaucoma prevalence with higher BMI and/or obesity index. Two studies assessed the effects of bariatric surgery, which both showed significant decreases in IOP post-operatively.

Conclusion: A higher BMI is associated with increased IOP in ground-based studies. IOP also decreased with weight loss. These data support the idea that alterations in body weight affect eye pressures. Further research is needed to understand the relationship between body weight and microgravity-induced visual changes.