Study Finds Cause of Visual Impairment in Astronauts

Press Release From: Radiological Society of North America
Posted: Monday, November 28, 2016

A visual problem affecting astronauts who serve on lengthy missions in space is related to volume changes in the clear fluid that is found around the brain and spinal cord, according to new research being presented today at the annual meeting of the Radiological Society of North America (RSNA).

Over the last decade, flight surgeons and scientists at NASA began seeing a pattern of visual impairment in astronauts who flew long-duration space missions. The astronauts had blurry vision, and further testing revealed, among several other structural changes, flattening at the back of their eyeballs and inflammation of the head of their optic nerves. The syndrome, known as visual impairment intracranial pressure (VIIP), was reported in nearly two-thirds of astronauts after long-duration missions aboard the International Space Station (ISS).

"People initially didn't know what to make of it, and by 2010 there was growing concern as it became apparent that some of the astronauts had severe structural changes that were not fully reversible upon return to earth," said study lead author Noam Alperin, Ph.D., professor of radiology and biomedical engineering at the University of Miami Miller School of Medicine in Miami, Fla.

Scientists previously believed that the primary source of the problem was a shift of vascular fluid toward the upper body that takes place when astronauts spend time in the microgravity of space. But researchers led by Dr. Alperin recently investigated another possible source for the problem: cerebrospinal fluid (CSF), the clear fluid that helps cushion the brain and spinal cord while circulating nutrients and removing waste materials. The CSF system is designed to accommodate significant changes in hydrostatic pressures, such as when a person rises from a lying to sitting or standing position. However, the microgravity of space presents new challenges.

"On earth, the CSF system is built to accommodate these pressure changes, but in space the system is confused by the lack of the posture-related pressure changes," Dr. Alperin said.

To learn more about the role of CSF in spaceflight-induced visual impairment and eye changes, Dr. Alperin and colleagues performed high-resolution orbit and brain MRI scans before and shortly after spaceflights for seven long-duration mission ISS astronauts.

They compared results with those from nine short-duration mission space shuttle astronauts. Using advanced quantitative imaging algorithms, the researchers looked for any correlation between changes in CSF volumes and the structures of the visual system.

The results showed that, compared to short-duration astronauts, long-duration astronauts had significantly increased post-flight flattening of their eyeballs and increased optic nerve protrusion. Long-duration astronauts also had significantly greater post-flight increases in orbital CSF volume, or the CSF around the optic nerves within the bony cavity of the skull that holds the eye, and ventricular CSF volume—volume in the cavities of the brain where CSF is produced. The large post-spaceflight ocular changes observed in ISS crew members were associated with greater increases in intraorbital and intracranial CSF volume.

"The research provides, for the first time, quantitative evidence obtained from short- and long-duration astronauts pointing to the primary and direct role of the CSF in the globe deformations seen in astronauts with visual impairment syndrome," Dr. Alperin said.

There were no significant post-flight changes of gray matter volume or white matter volume in either group of astronauts.

Identifying the origin of the space-induced ocular changes is necessary, Dr. Alperin said, for the development of countermeasures to protect the crew from the ill effects of long-duration exposure to microgravity.

"If the ocular structural deformations are not identified early, astronauts could suffer irreversible damage," he noted. "As the eye globe becomes more flattened, the astronauts become hyperopic, or far-sighted."

According to Dr. Alperin, NASA is studying a number of possible measures to simulate the conditions that lead to VIIP and testing various countermeasures.

Co-authors on the study are Ahmet M. Bagci, Ph.D., Sang H. Lee, M.S., and Byron L. Lam, M.D.

Note: Copies of RSNA 2016 news releases and electronic images will be available online at RSNA.org/press16 beginning Monday, Nov. 28.

RSNA is an association of more than 54,000 radiologists, radiation oncologists, medical physicists and related scientists, promoting excellence in patient care and health care delivery through education, research and technologic innovation. The Society is based in Oak Brook, Ill. (RSNA.org)

For patient-friendly information on brain MRI, visit RadiologyInfo.org .

CONTACT: RSNA Newsroom, 1-312-791-6610; Before 11/26/16 or after 12/1/16: RSNA Media Relations 1-630-590-7762; Linda Brooks, 1-630-590-7738, lbrooks@rsna.org; Maureen Morley, 1-630-590-7754, mmorley@rsna.org

// end //

Emergency Contraception needs urgent review

29 November 2016

Emergency contraception must be reclassified and made available to buy straight from the shop shelf, bpas urges

- Women in the UK pay up to £30 for the most basic form of emergency contraception (EC), up to 5 times more than in other European countries
- One reason for the high price is the mandatory yet unnecessary and embarrassing consultation women must endure before being sold EC, which is kept firmly behind the counter
- As sexual health services providing free EC face cuts, more women will have no choice but to purchase EC to avoid unplanned pregnancy
- The British Pregnancy Advisory Service (bpas) believes EC should be reclassified as a General Sales List drug to enable it to be sold straight off the shelf without consultation, at a price women can afford
- #justsaynon campaign launched today highlights the outrageously high price of EC in the UK compared to France and calls on women to reject what is the ultimate sexist surcharge

It is now 15 years since the progestogen-only emergency contraceptive Levonelle One Step (now also sold as Boots Emergency Contraceptive and Consilient) was first made available to women to buy from behind the counter in pharmacies after a consultation with a pharmacist. The price was deliberately inflated and a mandatory consultation introduced, apparently to prevent women from using it as a regular method of contraception. Since its introduction, the use of EC in the UK has barely changed and remains low,[1] despite the fact that most women rely on user-dependent methods such as condoms and daily pills and should feel able to use EC when these methods fail or are forgotten.

Research has found that around one third of British women have had unprotected sex in the last 12 months, and the majority (67%) did not use EC.[2] bpas regularly sees women experiencing unplanned pregnancy who were deterred from seeking EC because of the obstacles to access, including the price. bpas is calling for EC to be reclassified as a General Sales List medication so it can be placed on pharmacy selves for women to buy without consultation.

British women pay up to £30 for Levonelle, which is more than anywhere else in Europe with the exception of Ireland. In France, the equivalent product costs around €7 (£6).[3] While a number of factors influence the high price, the fact that women must undergo a consultation before being "allowed" EC - even though there are NO circumstances where it would be unsafe - is one reason why the price is so high. There are no contraindications to the use of progestogen-only EC and indeed it is considerably safer than many other medications available without consultation from the shelf, including painkillers, Nicotine Replacement Therapies (NRTs) and digestive medications like proton pump inhibitors.

Emergency contraception is available for free from GPs and sexual health clinics, but for many women this is not a practical option. Appointments are can be hard to obtain and services increasingly restricted amid cuts to public spending. Some pharmacies take part in local programmes to provide EC free of charge, but they often serve only young women, the service is only available from certain pharmacies, and only when the pharmacist is on site.

There is no clinical reason for a woman to consult with a healthcare professional before she obtains EC, unless she wishes to. In many countries - including the US where women's reproductive

healthcare is far more politicised - EC is available to purchase without consultation, straight from the shelf.

bpas is calling on the Department of Health to launch an urgent review of retail access to EC in order to ensure women have affordable, straightforward access to EC. The #justsaynon campaign, launched by the charity today, highlights the outrageous price of EC in UK by demonstrating that it may be cheaper for some women to fly to France to buy EC than purchase it on their local high street.

Ann Furedi, chief executive of the British Pregnancy Advisory Service, said:

"It is utterly stupid that we have made a medication which gives women a second chance of avoiding an unwanted pregnancy so hard to obtain. There is no financial justification for the high price of this pill, nor clinical reason for a consultation before it can be sold. People are trusted to use a wide variety of medications sold on the shelves of pharmacies in a sensible and appropriate way. Emergency contraception should be no different. It's time to ditch what is the ultimate sexist surcharge and put emergency contraception where it belongs - on the shelf, at a price women can afford."

ENDS

For more information please contact the bpas press office on 0207 061 3377 07788 725 185, or email press@bpas.org

Just Say Non campaign website here: http://www.justsaynon.org.uk/

1 Trends in the use of emergency contraception in Britain: evidence from the second and third National Surveys of Sexual Attitudes and Lifestyles, Black et al, 2016

2 Use of and attitudes towards emergency contraception, Nappi et al, 2014

3 All figures from the European Consortium for Emergency Contraception: http://www.ec-ec.org/

ENDS

For more information please contact the bpas press office on 0207 061 3377 07788 725 185, or email press@bpas.org

Notes to Editors:

About bpas

bpas is a charity which sees more than 70,000 women a year and provides reproductive healthcare services including pregnancy counselling, abortion care, miscarriage management and contraception, at clinics across the UK. It supports and advocates for reproductive choice. More information can be found at bpas.org

[1] Trends in the use of emergency contraception in Britain: evidence from the second and third National Surveys of Sexual Attitudes and Lifestyles, Black et al, 2016

[2] Use of and attitudes towards emergency contraception, Nappi et al, 2014

[3] All figures from the European Consortium for Emergency Contraception: http://www.ec-ec.org/