

Tablet computers may interfere with settings on magnetically programmable shunt valves

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Researchers at the University of Michigan have found that the Apple iPad 2 can interfere with settings of magnetically programmable shunt devices, which are often used to treat children with hydrocephalus. The iPad 2 contains magnets that can change valve settings in the shunt if the tablet computer is held too close to the valve (within 2 inches). Such a change may result in shunt malfunction until the problem is recognized and the valve adjusted to the proper setting. Patients and their caregivers should monitor use of the tablet computer to ensure that no change is made to the valve settings. The results of this study can be found in the article "Programmable shunt valve affected by exposure to a tablet computer. Laboratory investigation," by Strahle and colleagues, published in the August 2012 issue of the *Journal of Neurosurgery: Pediatrics* and available online today.

The researchers first thought of performing this study because a tablet computer seemed to affect a programmable shunt in one of their patients, a 4-month-old girl with hydrocephalus. Three weeks after the baby had received the shunt, she was examined for shunt malfunction due to a changed setting in the magnetically programmable valve that regulates the flow of cerebrospinal fluid. The baby's mother stated that she had held an iPad 2 while holding the infant. Programmable shunt valve settings can be altered by exposure to [magnetic](#) fields. Indeed, specialized magnets are used by [physicians](#) to adjust the settings on these valves. Since in this case no other [environmental factor](#) could be identified that would have led to a shift in the valve settings, the authors decided to test whether the iPad 2 might be implicated because, unlike

the initial iPad, the iPad 2 contains several magnets and is often used with an Apple Smart Cover, which contains additional magnets.

The researchers tested 10 programmable shunt valves with a variety of settings. They exposed the valves to an iPad 2 with and without the Smart Cover at different distances: less than 1 centimeter (cm), 1 to 2.5 cm, 2.5 to 5 cm, 5 to 10 cm, and greater than 10 cm. Each exposure lasted 10 seconds. Overall, the valves were tested 100 times for each of the five distances during exposures to the iPad 2 with the Smart Cover closed and 30 times for distances less than 1 cm for the [tablet computer](#) without the cover.

After exposure of the programmable valves to the iPad 2 and Smart Cover at distances between 0 and 1 cm, the researchers found that the settings had changed in 58 percent of the valves. After exposure at distances between 1 and 2.5 cm the settings had changed in 5 percent of valves, and after exposure at distances between 2.5 and 5 cm the settings had changed in only 1 percent of valves. No changes in valve settings were identified after exposures at higher distances.

After exposure of programmable valves to the iPad 2 without a cover, which was only tested at distances between 0 and 1 cm, the researchers found that the settings had changed in 67 percent of the valves.

Although no change in setting was found past a distance of 5 cm (2 inches), the authors caution that patients and caregivers should be made aware of the potential for a change in the settings of a magnetically programmable shunt valve if an iPad 2 is placed very near. This is not to say that the iPad 2 cannot be safely used in the vicinity of patients with programmable shunts. A variety of magnets can be found in households today, and the authors state that the [magnetic field](#) strength of the iPad 2 lies within the range of these everyday magnets. Therefore, patients and [caregivers](#) should regard precautions surrounding the use of the iPad 2 to

be the same as those taken with other household magnets. Cormac Maher, M.D., a pediatric neurosurgeon and lead author of the report, said that he hopes to raise awareness of this potential interaction through publication of this study.

More information: Strahle J, Selzer BJ, Muraszko KM, Garton HJL, Maher CO. "Programmable shunt valve affected by exposure to a tablet computer. Laboratory investigation." *Journal of Neurosurgery: Pediatrics* 10:118, 2012; [DOI: 10.3171/2012.3.PEDS1211](https://doi.org/10.3171/2012.3.PEDS1211)

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