

WHAT HAPPENS WHEN BRAIN MRI STUDIES ARE DONE ON THE ASYMPTOMATIC PERSON

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A common dilemma facing physicians is finding results on radiographic studies that were unexpected. Nowadays, many patients are getting sophisticated brain scans because of car accidents, headaches and other reasons that, in the past, would not be getting such high resolution scanning of the central nervous system.

A recent paper by Katzman et al published in the prestigious Journal of American Medical Association (JAMA) evaluated such issues.

For this study, one thousand healthy volunteers underwent brain MRI scanning between May 1996 and July 1997. Abnormalities were then categorized as:

1. No referral necessary. This would include common findings such as inflammation of the sinuses or sinusitis.
2. Routine referral. That is, abnormalities which were considered remote and unlikely to have any urgent needs, such as, old stroke or brain infarction.
3. Findings requiring urgent referral - such as low grade or slowly growing brain tumors.
4. Immediate referral required - such as current or active bleeding in the brain.

So-called T1 and T2 images were performed on the MRI. T1 and T2 are magnetic sequences on MRI scanning producing different sensitivity of images. T2 images allow small abnormalities to be seen in the brain in a fashion that is less good than contrast study but is better than so-called T1 images only.

Contrast-enhancement was apparently not included. Contrast-enhancement using gadolinium is commonly used for patients undergoing brain MRI scanning to better delineate the anatomy of the brain and the potential presence of abnormalities. For most patients with tumors, this is recommended routinely.

Of these 1,000 patients, 546 were male and 454 were female. The age was 30.6 years with a range of 3 to 83 years. Normal studies totaled 82%. Abnormal studies accounted for 18% and included 151 that needed no referrals, 18 that needed "routine referrals", 11 that needed "urgent referrals" and zero requiring an "immediate referral."

Of the 151 that required no referrals, there were 132 cases of sinusitis, 12 cases showing age-related changes in the brain, 5 showing unspecified T2 abnormalities or so-called unidentified bright objects and 4 showing fluid in the mastoid or petrous sinus. These are findings that are not infrequent and rarely, if ever, have serious consequences. Sinus disease was seen in 13% of the patients and was more common in the spring months.

The routine referrals included 3 patients with what was felt to be old strokes, 3 with demyelinating disease (such as multiple sclerosis), 6 with cysts, 1 with an abnormal sella turcica (the location of the pituitary gland), 1 with a nasopharynx cyst, 1 with a fatty tumor, 1 with prominent temporal horns - a portion of the fluid drainage system through the brain, 1 with prior trauma and 1 with a scalp cyst.

Included in the urgent category was 3 patients with an arachnoid cyst, 2 with cavernous angioma, 2 with low-grade oligodendroglioma, 1 with pilocystic astrocytoma, 1 with low-grade glioma that was unconfirmed and 1 unconfirmed aneurysm.

Age-related changes were seen in 12 patients who were older than 55 years. Three brain tumors including two confirmed were found. One patient did not undergo surgical evaluation and follow-up is not known.

The authors noted that so many young people were included because the MRI is a demanding test and many older patients would not agree to sitting for a test that took up to 90 minutes in length.

Also they felt that the older patients might not wish to participate in medical research and would not need the small stipend which was paid to volunteers.

Three patients were felt to have demyelinating disease but was unconfirmed. One such demyelinating disease is multiple sclerosis. They were all lost to follow-up. So, in effect, how many patients actually had demyelinating disease remains unclear since clinical testing and follow-up would be needed.

Authors reported that "most interesting and potentially worrisome is our finding in three subjects of suspicious primary brain neoplasm. One of these patients underwent resection and was found to have a low-grade oligodendroglioma. Patient examination by the neurosurgeon prior to surgery showed no signs or symptoms. A second patient underwent resection elsewhere and was found to also have a low-grade astrocytoma." Thus, the likelihood in healthy volunteers of brain tumors was 0.2%.

Another similar study published elsewhere of 3,672 subjects, all older than 65 years found 20 brain tumors including one CNS primary brain lymphoma and 19 meningiomas.

The researchers were taken by the 0.2% risk of primary brain tumors stating that "the reported incidence for primary CNS neoplasm is 20 to 30-fold lower than our findings." This raised the question of whether incidence of brain tumors is higher than reported in the literature or did patients say they were asymptomatic in order to get a free evaluation of their symptoms - or indeed receive payment for taking the MRI scan.

Thus, what happens when an asymptomatic young person gets an MRI? There is a high risk of an abnormality that is not very important and a very, very low risk of an abnormality being found that has great meaning and impact on life.

Given the natural history of astrocytomas, early diagnosis has never been advocated. It is not clear whether early therapy versus therapy introduced later in the disease course, will significantly alter the outcome. These studies will give oncologists and patients a clue as to the potential benefits of screening and diagnosis when no symptoms are present.

Further research will define the role of scanning asymptomatic people.