

IMAGING CAN KILL YOU!
(or ruin your day...)

TGIF HAPPY FRIDAY



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Nothing to disclose related to this talk



Incidental Findings IFs

The image features a dark, star-filled sky. In the center, there is a prominent nebula with a complex, multi-lobed structure, primarily in shades of blue and cyan. Scattered throughout the field are numerous stars of various colors, including bright yellow and orange stars, as well as some blue and white stars. The overall appearance is that of a deep-sky astronomical photograph.

Incidental Findings IFs

Abnormalities on medical tests that weren't what doctors were looking for—and probably mean nothing—can cause a lot of *anxiety*, and *incur costs in time and money*.
And at times much worse!

**As it turns out, incidental findings are
hardly incidental:
they turn up in about 1/3 of all CT scans**



There are two areas in which incidental findings are of escalating concern:

1. Biomedical research is critical to the advancement of medicine, and the unsung heroes are the legions of volunteers...

But these countless lab tests, CT scans, and MRIs done for specific research questions are as prone to incidental findings as tests done in the clinical world, and pose unique ethical dilemmas.

What happens when an incidental finding is noted? Are researchers responsible for obtaining medical care for the volunteer? Are they financially responsible for such care? Can there be any malpractice implications, especially for researchers who are also MDs?

2. Direct-to-Consumer (DTC) medical testing.

The development that has brought these ethical controversies to the forefront is the advent of **low-cost whole-genome sequencing**:

Just send a bit of saliva and \$99—shipping and handling included!—and you, too, can have the entire contents of your DNA laid out like a take-out menu.

What should be done if a direct-to-consumer genome test discovers a gene for a serious, heritable illness?

Does the company have an ethical obligation to make a referral for treatment? To inform family members who might also be at risk? What happens if the results show a chromosomal sex that is different than the person's known sex? What happens if testing reveals parental lineage that isn't what was expected? And what happens if the tests are wrong?

RESEARCH ARTICLE

The Current Impact of Incidental Findings Found during Neuroimaging on Neurologists' Workloads

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 OPEN ACCESS

Citation: Booth TC, Boyd-Ellison JM (2015) The Current Impact of Incidental Findings Found during Neuroimaging on Neurologists' Workloads. PLoS ONE 10(2): e0118155. doi:10.1371/journal.pone.0118155

Academic Editor: Rex Eugene Jung, University of New Mexico, UNITED STATES

Received: March 10, 2014

Accepted: January 8, 2015

Published: February 27, 2015

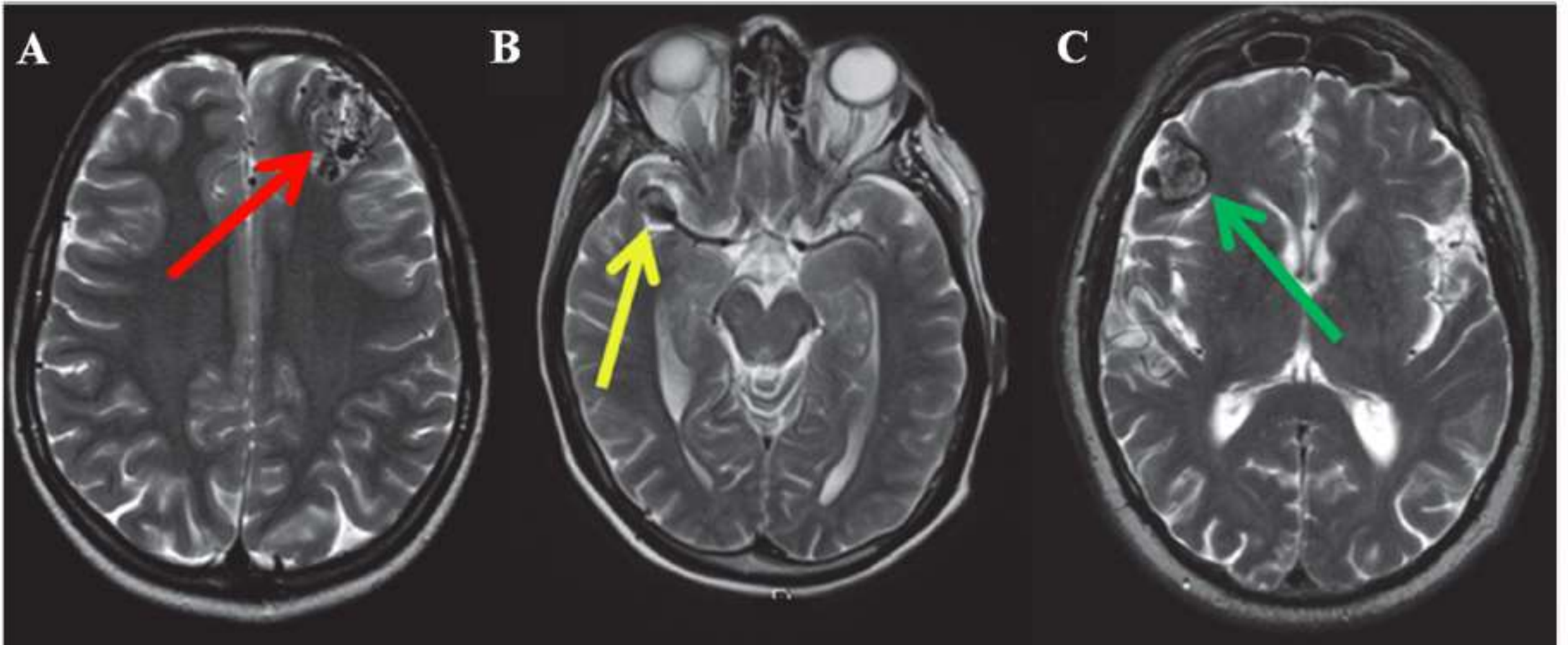
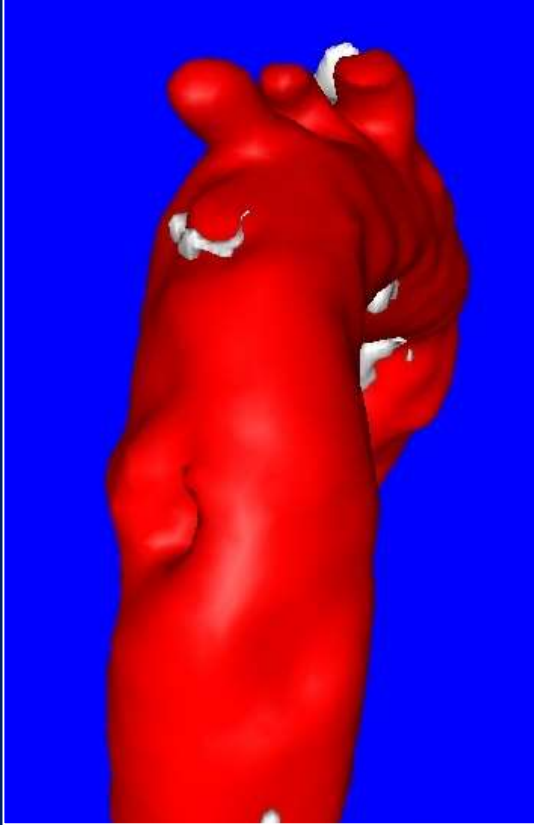


Fig 1. Examples of IFs on axial T_2 weighted sequences: (A) an arteriovenous malformation (AVM) in the left frontal lobe (red arrow); (B) an aneurysm at the right middle cerebral artery bifurcation (yellow arrow); (C) a cavernoma in the right frontal lobe (green arrow).

Conclusions

Neuroimaging IFs continue to impact on neurologists, 'patients' and the parent healthcare institution. If 'patients' need to be cautious of VOMIT [27], perhaps the healthcare system needs to be cautious of SPEW (Scans Propagating Exponential Workloads). Management approaches have been described in the research community as well as in the clinical arena as described in this study. Issues surrounding consent and disclosure of IFs are common to both research and clinical imaging, however determining the indications for imaging in the first instance is a singularly clinical management issue. Participants felt that clinical patients should be informed of the risks of IFs prior to imaging in the same way that research volunteers are, especially when patients insist that they undergo neuroimaging. This study suggests that, as a minimum standard of care and when clinically appropriate, informed consent prior to neuroimaging might be prudent.



AORTA IFs

Tiny asymptomatic ulcers

Small aneurysms and dilations

Small ductus remnants

Uncomplicated chronic dissection

And many more...

2011 Editorial:

- CT use growing 10% annually
- Radiation exposure to U.S. population increased 600-fold in last 20 years
- Chest CT 400x radiation dose of a chest x-ray
- 1.5-2% of all cancers in the USA attributable to CT use*

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Cited recent example of a Radiology Chairman who had a CT colonography that uncovered a renal lesion, hepatic mass, and multiple lung nodules; this led to a \$50,000 work-up, and major thoracic lung surgery followed by prolonged recovery

WHAT CAN WE DO?

WHAT CAN WE DO?

- We must reduce the # of CTs being ordered, and have a good reason to order one!
- Need guidelines!
- Must apply the ALARA (“as low as reasonably achievable”) Principle: evidence shows CT radiation doses could be reduced by 50% without affecting diagnostic accuracy
- Must inform patients of CT risks before ordering
- Physicians should monitor cumulative individual CT radiation exposure over time and provide this information accordingly

Two **IF** facts seem to hold true regardless of the organ system in which they are found or the discipline studying them:

1. the vast majority are benign, and
2. as the use of imaging continues to climb, they are being encountered at an increasing rate.

“We are more frequently being presented with non-emergent distracters that, more often than not, represent *risk instead of benefit to the patient*”

“If you ask me..., once the CT or test has been performed and the IF uncovered, the cat is out of the bag and it can be very difficult to ignore – particularly when the IF seems or sounds significant...”

The Dangers of Incidental Tumor Findings from CT Scans:

A new study shows that the risk of kidney removal surgery increases for Medicare beneficiaries *living in a high-scanning region*.



The best way to prevent IF debacles is through avoidance of unnecessary scans and testing in the first place!

One scan leads to another

One of the insidious ways that unnecessary CT scans increase risk is that a single CT test often leads to another, then another. A disturbing example of that dangerous cascade was featured in an article in the September 2014 issue of the Journal of Patient Safety co-authored by John Santa, M.D., medical director of the Consumer Reports Health Ratings Center.

An 11-year-old girl received a CT scan because of possible appendicitis. That was the first mistake: An ultrasound, which does not emit radiation, is the best initial test in such situations. The second error occurred when her CT showed a normal appendix but her doctors noted a spot on one lung and decided that it warranted a follow-up CT. Such incidental findings are so common doctors have a name for them: incidentalomas.

Expert advice is to ignore the vast majority of those results because slight abnormalities seen on scans are very common but rarely harmful. Yet many doctors find the urge to order follow-up tests irresistible.

For the 11-year-old girl, the CT didn't reveal a tumor or any other problem, but over the next two years her doctors recommended repeat scans of her lungs, all of which would further increase her cancer risk.

Why is there so much overuse?

Here are the Main Reasons:

- **Financial incentives**
- **Fear of lawsuits**
- **Uninformed physicians**
- **Patient demand**
- **Lack of regulation**

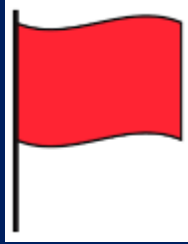
WHAT YOU CAN DO

- Ask why the test is necessary
- Check credentials
- Ask for the lowest effective dose
- Avoid unnecessary repeat scans



"I'm disappointed; if anyone should have seen the red flags, it's you."

GET A SECOND OPINION if...

- ***Your doctor (or group) owns a CT scanner or has a financial interest in an Imaging Center*** 
- Your doctor recommends a “whole-body” CT scan
- Your dentist recommends a 3D dental shot (cone-beam CT)



THANK YOU!



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