MODS & MRI'S... CAPTIVE BEADS & CT'S...

MEDICAL MYTHS VS. RESEARCH REALITIES

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In the emergency department, diagnostic imaging (X-rays/CT scans/MRI's) has become an integral part of many diagnostic processes. This fact is coupled with the recent findings of an undergraduate college student study in which 23% of students had tattoos & 51% had something pierced beyond their ears! (Mayers 2002) As body piercing & tattooing are certainly on the rise, the medical implications of these body modifications are becoming more & more evident. However, when it comes to diagnostic imaging and body jewelry, the motto of "when in doubt… just take it out" is not always practical, reasonable, or even possible. This brief overview hopes to illustrate some of the controversies & medical realities of body modifications & emergency imaging.

Review of the literature: Body piercing & diagnostic imaging

What really happens when patients with piercings undergo diagnostic imaging? Urban legend says that jewelry will "fly across the room" during a magnetic resonance (MR) scan & the artifact from jewelry or tattoos will make CT/MR studies unreadable. However, a review of the medical journals, along with discussions with radiologists and surgeons, found that in many cases, this is indeed, urban legend. The majority of published articles that address MR & piercings, focus not on the potential artifact, but on the safety of performing the procedure. (Editor's note: In this article, "artifact" refers to the image of jewelry or other material that obstructs the scan's view of underlying tissue.) If quality body jewelry is used (316L Stainless Steel, Titanium, Niobium), the research shows that performing MR examinations is safe. Testing the jewelry prior to entering the MR suite with a handheld magnet, though not failsafe, has been suggested as a "quick & easy" screen to determine ferromagnetism (i.e. will the jewelry rip out of the patient & fly into the magnet?) Interestingly, the vast majority of the medical literature focuses not on piercings & imaging, but on what happens with tattoos & MRI's (i.e. potential heating of the ink & subsequent burns). Though not the focus of this particular review for The Point, this complication is very rare, but indeed has happened, and those with tattoos, as well as the technicians performing the MRI, should be aware of this fact.

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From a trauma perspective, the goal of our research was to review the published literature and detail what "does & doesn't happen" with heavily pierced/tattooed persons & diagnostic imaging. To accomplish this, a volunteer professional body piercer underwent CT & MRI imaging. As he was pierced & tattooed "from head to toe," he was the ideal "model" for our research.

Summary of our model's piercings/tattoos

SS (316 stainless steel) & T (titanium)

- Tattoos "everywhere"
- Eyebrow: SS & T
- Nose: SS, T, & Tygon
- Tongue: SS
- Ears: SS, bone, amber, & niobium
- Neck: SS barbells taped to back of neck to simulate surface bars
- Abdomen: (3) pieces of jewelry (cubic zirconia & "piercing retainers") taped to abdomen
- Genitals: SS

Note: No hand-held or MRI magnet attraction to the retainers, SS, titanium, niobium, gold, bone, or amber jewelry was found.

MRI Studies:

Prior to entering the MRI suite, a handheld magnet was used to quickly determine the ferromagnetic status of his jewelry & he was cautioned to inform the technician immediately if there were any warm areas or noticeable pulling on the jewelry during the procedure. The "patient' experienced no adverse effects during the procedures & the results were quite surprising. The brain and spinal cord was, from a trauma perspective, able to be visualized throughout. Interestingly, the main source of the artifacts was the earrings. Of note, the mouth/nose/eyes were also significantly distorted due to artifact from the jewelry, but the "trauma areas," i.e. brain & spinal cord were able to be seen with acceptable quality. The pictures of the abdomen showed minimal artifact as well, and from a trauma perspective, the key organs able to be seen throughout.

CT:

In the medical journals, the concerns with CT scanning & tattoos/jewelry are primarily focused around artifact. The ear jewelry was

Mike "Koz" Kozlowski pre-MRI scan

again the biggest source of artifact, but as with the MRI images, despite over 15 pieces of jewelry in and around his head, the brain & spinal cord were able to adequately visualized. There was some definite artifact on CT scan across the uppermost cervical spine and the floor of the mouth. Also, the orbits were poorly seen and are possibly the biggest artifact overall (imagine that with 6 pieces of jewelry in the eyebrow). CT examinations of the chest & abdomen were similar to the MRI findings with the key internal organs that are commonly of concern in trauma able be visualized adequately.

In summary, though adverse events such as burns from tattoos/ MRI's & artifact from body jewelry have been described, they are, in comparison with the amounts of imaging studies that are done, incredibly rare. As with any procedure, screening & patient safety are paramount, but with a knowledge of the research, as well as an "open mind" many diagnostic imaging procedures can be very safely done "without taking it out!"

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Note: A complete version of this subject including the medical review of tattoos & imaging as well as piercings and "regular x-rays"/ultrasound is currently being reviewed for publication in an upcoming emergency and trauma medical journal.

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