

Will Virtual Autopsy Replace Pathologists?

Marni Wenzel

Carroll University, Masters of Pathology Assistants' Program, Waukesha, United States

INTRODUCTION

Virtual instrumentation has begun to make its way into the autopsy suite. It has never been stated that these technologies have hindered or been detrimental to the process; the complete opposite is noted. It aids pathologists in many aspects of the autopsy overall. However, with newer technologies and 3D imaging techniques, it can be debated that the need for invasive autopsies may no longer be deemed necessary. If there is no longer a need for standard autopsies, and only imaging is needed, what would happen to the role of the pathologist?

BACKGROUND

In the past century, the autopsy has changed very little. A standard, yet thorough, internal and external examination are performed on the decedent. This has all been done by the hands of a prosector, pathologist, diener, or someone in between. Very little alternative instrumentation has been used, until recently. The use of CT (imaging technique using X-rays taken at many different angles to create a 3D image), MRI (protons responding to a magnetic field, creating pulses that can be digitized into 3D images), and 3D scanning began to be used in the forensic setting beginning in the 1970s. There have been many compelling reasons for these alternative methods to be established in the autopsy suite. There is not much evidence that does not support the use of them, but will the imaging methods replace the need for a traditional internal examination?

DISCUSSION

Pros

- Data can be visualized, stored, and easily accessible for reinterpretation
- Non-invasive alternative
- Some religious beliefs prevent full autopsy
- Families worried about disfigurement
- Can be more accurate in determining abnormalities and cause of death in fetuses, newborns, and infant patients
- Easier to determine findings on decomposed bodies
- Difficult findings are made easier
- Angles of knives and bullet wounds
- Foreign bodies, fractures, fluid/gas accumulation, calcifications
- Can aid in guiding the prosector in where to collect samples from for microbiology, toxicology, and histology
- Easier court processes – easier for lawyers show the images in court

Cons

- Sudden and unexpected deaths are almost impossible to diagnose on imaging alone
- Poor ability to differentiate soft tissue interfaces and vascular lesions
- Coronary Artery Disease – can't be diagnosed, need to assess the vasculature itself
- Livores mistaken as pneumonia
- Putrefaction can mimic emphysema
- Colors, textures, smells are completely lost and can be diagnostic
- Microscopic evaluation lost if only virtual exam is the only thing used
- Financial limitations
- Purchasing, installation, and maintenance of the instrumentation
- Lack of knowledge – Not all pathologist are trained in radiography
- Usage of the instrumentation itself
- How to read the scans produced

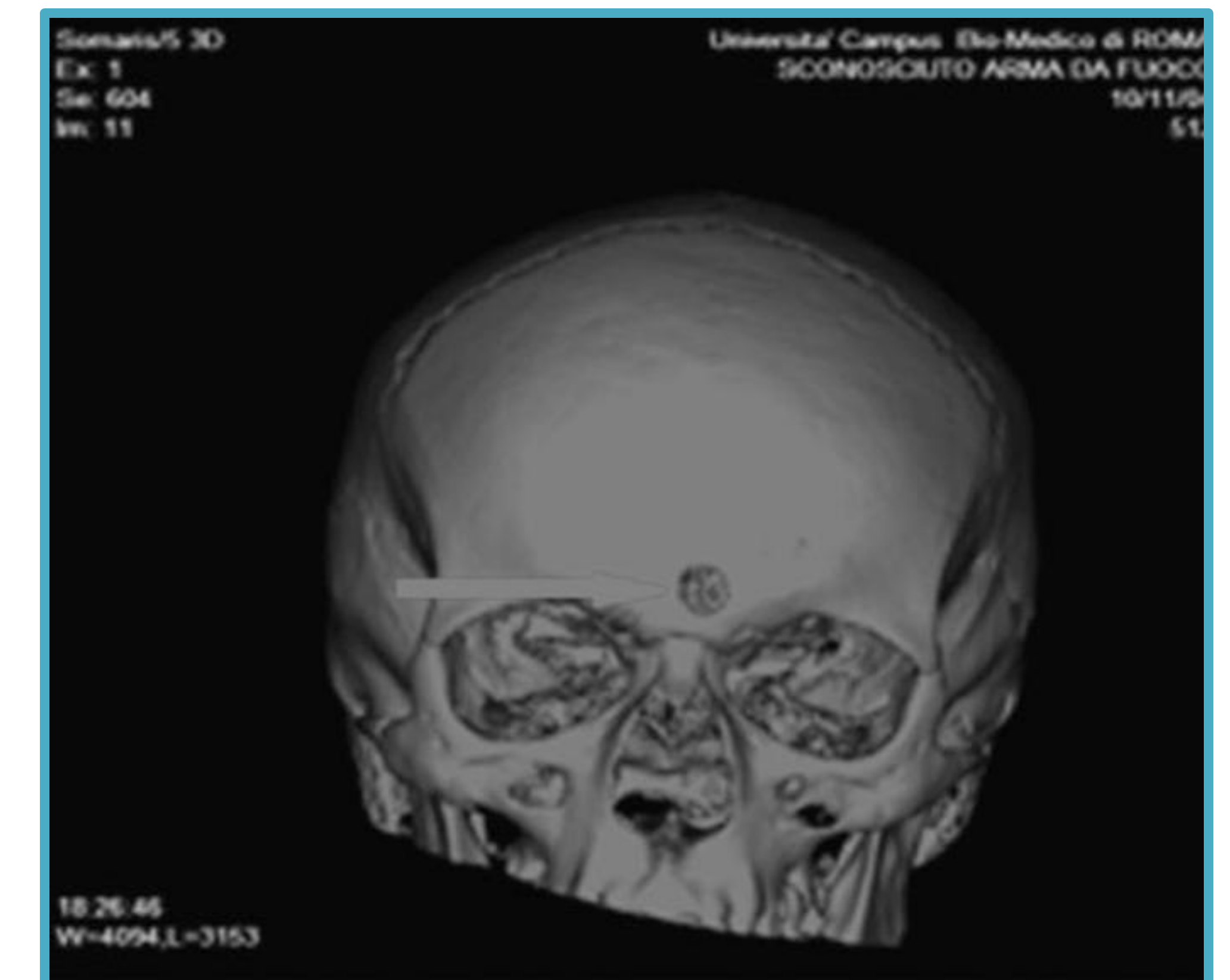


Image 1: CT scan displaying a gunshot entrance wound

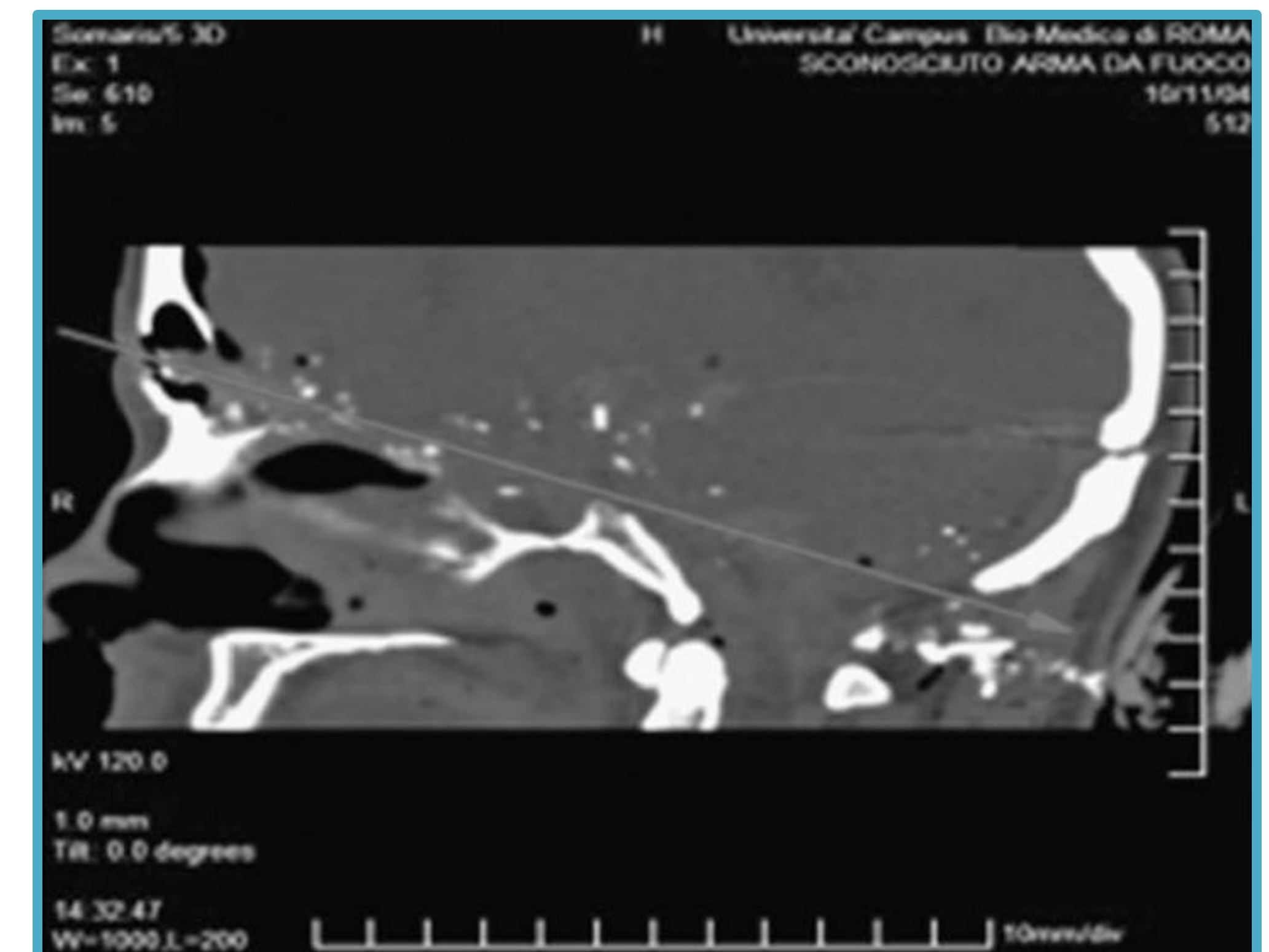


Image 2: CT scan of the path of a bullet wound with bone fragment deposition

CONCLUSION:

There are many pros and the cons do not seem to support not implementing these imaging technologies in the autopsy suite. Using CT/MRI during the initial steps of autopsy and during autopsies that require restriction could be a great asset. However, when looking at all deaths, there are still many reasons a full internal examination by a pathologist is required. Sudden deaths, such as those caused by coronary artery disease, cannot be diagnosed without internal examination of the vasculature of the heart. Important diagnostic features are lost when an internal evisceration is not performed. These technologies are great aids, and if an institution has the funds to implement them, they are extremely useful. However, the role of the pathologist is still necessary.

METHODOLOGY:

Using Google Scholar, PubMed, Elsevier, Science Direct
The American Journal of Forensic Medicine and Pathology
There were not strict data points, only examples of cases where the technology was used and articles describing the pros and cons
The search was not narrowed, as there is limited information on the topic

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