# Diagnostic diligence in trauma and injury care through forensic pathology.

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## Abstract

**This article denotes the severity of necessity attached to diagnostic diligence concerning forensic pathology/death investigation, and thus it is directly pertinent to diagnostic procedural standards and practices in institutions of emergency care regarding more obscure or rare types of injury. A generic scenario is drawn upon from the author's academic experiences in order to depict this in an accurate and validly weighted manner. The roads less travelled concerning other than average diagnostic procedure in emergency and/or first responder care in situations delineated such as herein, are claimed by the author to be what could be called a weak point in the nature of quality that can be statistically measured in emergency care by precedent of the rarity of certain types of injuries. This is explored in mild depth through scenario depiction and pathological evaluation. The scenario itself can be considered to be a Question of sorts, the answer can be considered to be a type of diagnosis, and the discussion/conclusion demonstrates the overarching point or claim of this article in its relevant concerns regarding scarcely encountered trauma and/or injury types.**

**Keywords:** Trauma, Injury, Investigation, Pathology.

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## Trauma/Injury Scenario

### *Question*

According to Stabley (2017): The body of a 41-year-old male is found caught on the rocks of a slow flowing river. The body is lying on its right side. The decedent is fully clothed, including shoes. There is obvious evidence of external trauma to the body, consisting of facial lacerations. No evidence of blood is found on the rocks. The portion of the face and head in the water do not demonstrate any evidence of bleeding, however a minimal amount blood is found in the right external ear canal. Upon examination in the morgue, obvious facial fractures are found on x-ray and grossly. A faint fern-like discoloration is also noted over the superior aspects of the anterior chest [1].

a) What possibilities exist that would account for this death?

b) What further findings do you believe might be found at autopsy? (p. 2-3).

### *Answer*

According to Lewis [2]: The first thing to look at in this case is the fact that the decedent is lying on his right side. It then becomes relevant to look for livor mortis on this side of the decedent's body in order to help determine if this is the final place that the decedent was at the time of death. This will possibly then reveal if the decedent was moved to this spot after he died or died and was then moved here by the current of the river he is found next to. The next element to explore here is to know that looking for a basilar skull fracture at autopsy can explain why he was bleeding from the ear. It should be known that contact forces or "impact loading" are what typically causes these types of fractures and ear bleeding that occur in concert after death. But there is warning to be heeded regarding this type of injury in this type of death investigation. According to Spitz and Spitz [3], "Contact forces may also cause cranio-cerebral injuries away from the impact site including basilar skull fractures, contrecoup contusions and parenchymal hemorrhage" (p. 391). So, there are other possibilities to look at or for in this investigation to determine what caused his death, including looking for multiple alternative injury sites as this is consistent with this type of injury. This theory, if correct makes the most likely cause of death here an intracerebral hemorrhage due to blunt force trauma.

Another aspect of this case to analyze is that of the fern-like discoloration on the upper part of the front of the decedent's chest. This most probably some type of algae growing on the decedent since the time of death. This brings to light that the decedent might have been dead for some time, which could explain why there was no significant amount of blood found around the body other than the ear secretion. In other words, he may have floated here from up river and washed ashore from any good distance. What is said concerning this in Spitz and Spitz (2006) is that "With time, algae may grow on the skin and clothing imparting a green or green-black discoloration to these areas" (pp. 856-859). This definitely has the potential to distort the possible time of death that could be obtained regarding this decedent. What the manner of death in this case is may be difficult to discern as well. It is however certain that blunt force trauma caused the death, and thusly narrows the possibilities to at least certain things regarding determination of the manner of death. There will definitely be a good amount of edema in multiple areas of the body considering all of the liquid involved in this investigation as far as further findings are concerned. It is of a curious question to ponder what exact type of algae that is

on this body, therefore, botanical and/or palynological testing is bound to produce a conclusion regarding this question (pp. 7-8).

## Discussion, Conclusion, and Recommendations

In order to strike directly as a hatpin to the heart of this trauma/injury scenario and the answer submitted in Lewis (2017), it is primarily pertinent to point out that it is incorrect and/or at least incomplete in its conclusion. The faint fern-like discoloration noted to be approximately located on the superior aspects of the anterior chest of the decedent should be immediately identified as very likely being what is known as a "Lichtenberg Figure" which is known in forensic pathology to denote lightning strike or possibly other high voltage/ampere electricity passing through a biological organism possessing vessel circuitry (circulatory system) for blood flow. Even though its pathogenesis is markedly unknown, it is documented as being pathognomonic for lightning strike injury. This is where diagnostic diligence comes into play regarding an issue of this nature for emergency medicine diagnosticians. There are rare cases within the rare case spectrum of treatment regarding electrical trauma/injury where emergency medical personnel intervened to save patient lives. But the level of knowledge and training regarding how to identify is seriously lacking in emergency medicinal practice, literature, and basic working knowledge base.

One such example denoted according to Cushing and Wright is that [4]:

Electrical injuries, although relatively uncommon, are inevitably encountered by most emergency physicians… The spectrum of electrical injury is broad, ranging from minimal injury to severe multiorgan involvement to death… Approximately 1000 deaths per year are due to electrical injuries in the United States, with a mortality rate of 3-5%. (para. 1-2)

A few things that can be mined from this information are readily apparent to the critical eye. Firstly, the rate of occurrence of electrical injuries in general is to high enough of a degree that they are almost a certainty of an inevitable encounter with emergency rooms. This gives a deep glance into the fact that identification of electrical trauma/injury such as with the Lichtenberg Figure could arguably be said to be paramount to efficiency of patient care. Secondly, it is also fair to point out that there is a question of "how bad is the injury?" that is left wanting for solution. A suggestion for this would be quick reference posters available to emergency room personnel if even only nothing elsewhere save emergency departments located in the higher concentrated areas for this type of injury. Finally, it becomes overwhelming to the objective observer to deduce that out of the around 1000 patients per year due to electrical types of injury in the U.S, only around 50 or less of them join the decedent pool. This could be viewed as meaning that there are more patients that live despite what legends of lore there are that may circulate, regarding whether or not triage is gloom and doom for electrical types of injury. In any which case, the case for raising awareness seems to be systemically reemergent concerning what can be examined in some of the more readily available medical literature as well the lesser commonly known publications.

Inserting scaled exemplar photos of severity correlated Lichtenberg Figures into emergency medical facilities in perhaps poster format as is classically available with simple anatomy and body system posters is definitely something to think about adding to the known repertoire of lighting injury workups. The workups usually consist of CBC, Isoenzyme CK, elevation of serum myoglobin, electrocardiography, and even neuropsychological batteries for cognitive therapy in less common cases. At any rate, there is a strong argument to be made regarding an appendix of this proposed manner in an effort to temper or augment already existing practices in order to ensure ethical diagnostic diligence with injuries in this categorical domain of inquiry.

## References

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