

Is Archer Being Poisoned by Bullets?

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Abstract

This paper aims to determine whether Sterling Archer from the TV show *Archer* would suffer significant physical and mental effects based on the number of times he has been shot, and consequently how much lead has accumulated in his circulatory system. Taking the number of times he has been shot to be 34, and presuming that none of the bullets have been removed (as implied in the show), it can be calculated that his blood-lead content is $279 \mu\text{g dL}^{-1}$. This far exceeds the adult poisoning threshold, and so it is likely that Archer has been affected by lead poisoning.

Introduction

Sterling Archer is the main protagonist of the eponymous animated show *Archer*. He is described to be “the world’s deadliest spy” [1] for the International Secret Intelligence Service; a fictional agency located in the Pentagon, with terrible security and a dubious moral code [2]. As with most other fictional spies, Archer spends a lot of his time in dangerous situations, often involving a large number of bullets. It is stated in the show that he has been shot 34 times as of ‘Sitting’ (Season 6, Episode 6), with no mention of having any medical procedure to remove any bullets. He even expresses a fear of lead poisoning from these bullets [3]. Using this information, this paper will attempt to determine whether Archer has been significantly affected by elevated blood-lead concentration, or blood-lead levels (BLL).

Assumptions

In order to calculate Archer’s BLL, a number of assumptions must be made. Since there is no way of determining the variants of bullet with which Archer has been shot, it will be assumed that all bullets were manufactured equally, with between 50 – 100% lead content [4].

Owing to the variable nature of symptomatic response to lead poisoning, the first symptoms can present between two days and forty years after the initial poisoning event [5]. It shall be assumed that, if

Archer has indeed exceeded the poisoning threshold, that the symptoms have already been presented.

BLL Increase Per Bullet

The rate of lead poisoning from a bullet depends on a number of factors; the site of impact, type of bullet, whether the bullet was removed or not, as well as the age, gender, and diet of the victim [6]. Considering this, the amount of lead secreted into the blood per bullet will be calculated from the mean BLL increase over a year, as shown in Figure 1 below.

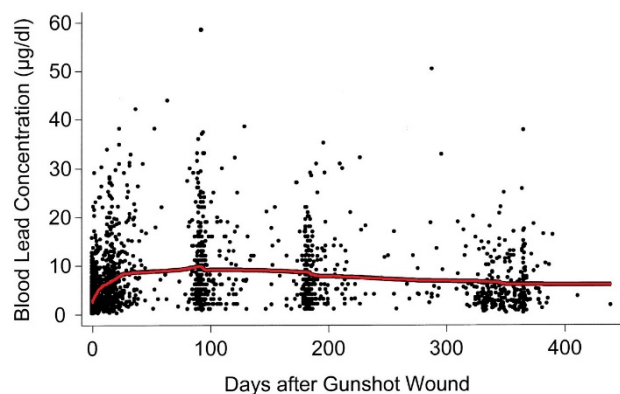


Figure 1 – Measured BLL as a function of time for 451 gunshot victims (adapted from [4])

This shows that, from one retained bullet, the rate of BLL increase is faster for the first 25 days, reaching a maximum at around 90 days after the shooting. Using this variation, the difference in time since each shot should be accounted for, since the BLL stays approximately constant after 90 days post-shot.

As can be seen in Figure 1, after 90 days one bullet will have increased the victim’s BLL by $8.21 \mu\text{g dL}^{-1}$ [4]. Multiplying this upwards to account for all 34 of Archer’s bullet wounds, this means that his overall BLL is $279 \mu\text{g dL}^{-1}$.

Defining Lead Poisoning

Since the effects of elevated BLL and lead poisoning vary from person to person, there are multiple thresholds defined, beyond which lead poisoning is said to have occurred. For the purposes of this paper, the higher thresholds are considered as a conservative estimate, and to accommodate the fact that Archer “displays almost absurd levels of strength [and] durability” [7]. These are detailed in Table 1 below:

Blood-Lead Concentration (BLL) ($\mu\text{g dL}^{-1}$)	Adult Risk Level
< 10	Minimal (normal levels)
> 45	Gastrointestinal symptoms
> 70	High risk of acute central nervous system symptoms
> 100	Potentially fatal

Table 1 – Potential levels of risk to adults at various BLL [8]

If Archer’s BLL is $279 \mu\text{g dL}^{-1}$, this places him at almost triple the BLL of the highest risk level in Table 1. Therefore it is not only improbable that he is still alive, but it is also highly likely that he experiences some of the side effects of lead poisoning.

Archer’s Symptoms

There are a number of symptomatic criteria for a patient suspected to be suffering from lead poisoning – common symptoms of acute poisoning include: abdominal pain, vomiting, encephalopathy, jaundice, and lethargy [8]. Whilst it is difficult to determine whether Archer exhibits these symptoms due to the director’s license over what is shown, it can be argued that he does indeed exhibit some of these on-screen.

His laziness is so pronounced that it’s listed as one of his personality tropes [7]; it is a common fallacy to call chronically fatigued or lethargic people ‘lazy’ [9]. His refusal to read mission dossiers [10, 11] could either be a product of this fatigue, or a sign of the lack of

focus which comes with encephalopathy [12]. Additional signs of encephalopathy include memory difficulties, inhibited problem-solving skills, and poor decision-making. Archer is known for repeating the phrase “I swear, I had something for this” throughout the duration of the show [1], and regularly asking “what year is this?”. This implies a continued loss of memory function – although it is possible that the latter comment refers to the ambiguous timeline of the show. He frequently makes poor decisions, placing himself and his colleagues in danger; he will regularly appoint himself as the leader of a mission, regardless of whether he is the best person for the position or not [13]. As such, Archer is known as “the most dangerous spy” to both enemies and teammates [7].

Some sources also suggest that lead poisoning can lead to conditions such as attention deficit hyperactivity disorder (ADHD) and autism [8]. Archer’s close friend Lana Kane has suggested that: “he’s got some rare kind of pervasive developmental disorder, or even undiagnosed atypical autism” [14]. However, the current evidence is not robust enough to make suggestions regarding whether Archer’s BLL could have contributed to his possible developmental disorders [15, 16].

Conclusion

Using the lead concentration per bullet, it was determined that Sterling Archer has a BLL of $279 \mu\text{g dL}^{-1}$. This is almost three times greater than the threshold for the fatal dosage; thus, it is likely that he does experience many of the symptoms associated with lead poisoning. Additionally, if all 34 bullets remain in his system, it is likely that they will cause further physical damage to surrounding tissues if they are not removed.

Considering that television shows are selective in what is shown in each episode, meaning that the number of bullets remaining in Archer’s body may be higher or lower than the suggested value, and some symptoms may not be shown on-screen. However, it is still likely that Archer suffers symptoms such as lethargy and encephalopathy from his high BLL. These effects are shown throughout his appearances on the show; one can only hope that a member of the team can see past his somewhat abrasive demeanour and alcoholic tendencies, and encourage him to seek medical treatment for these alarming symptoms.

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