

THE INJURY OF IMAM ALI AND HIS DEATH

A STUDY IN NEUROSURGICAL AND MEDICO LEGAL ASPECTS

Summary:

Study of those who changed history usually is limited to their lives and what they have achieved. However, it would be beneficial to study the medical causes of their death and circumstances surrounded that. To that end, many studies offered details about the passing of prophets, reformers, politicians, scientists, musicians, and others which may add more aspects to studying these personalities. This study is an attempt to highlight the medical sequences of death of Imam Ali Ibn Abi Talib, (AS), who was the fourth Caliph of Islam after Prophet Mohammad. This study is an attempt to arrive to a conclusion as to the direct and indirect causes of Imam Ali's death in 661 A.D. after he was hit by Abdul Rahman Ibn Muljim on his head by a poisoned sword. That hit inflicted a deep wound to the skull, which penetrated to the brain. Two days after injury he passed away. Clinical analysis as to the cause of death did not go with the head injury or with the poisons studied to be the definite causes of death. This work tried to throw some light on many issues; basically on the circumstances when Imam was injured namely, what was his position when he was hit? Where in the head was the injury? What damage did it make

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in the head? Did the head injury cause his death? Was the poison the cause of death? Is there another possible cause of death? From the study it was concluded that the Imam was struck while in an upright position, on the left frontal area of his head. The injury went down through the skull bone to injure the brain. There was a significant gap in skull bone and depth of wound was around one inch. The meninges and brain were injured down to the white matter. However, it was concluded that head wound was not the direct cause of death as there were no signs of meningitis or infection to the brain; and the Imam remained completely alert until his death which is impossible if damage of brain or infection of brain or meninges were the cause of death as the patient must be comatosed prior to death. It also appears that the likely poisons used at that time which were studied did not cause his death, as his clinical state after injury did not match the clinical descriptions of poisoning with those poisons. Other possible causes of death were discussed and again no evidence that any was the direct cause of death. It is likely that his death was the result of a mixture of causes, including poisons which were not studied.

Key words:

Imam Ali, Ibn Muljim, head injury,

neurosurgery, poisoning, history of important people, forensic medicine

Introduction:

At the White Palace auditorium, a cultural center, in Baghdad in 1996, a speech was delivered by the author entitled "Society and Brain Surgery," It included two major issues; Brain as a cause of suffering to society in cases of illness and wrong doing, then brain as a victim of society in cases of trauma or poisoning and other causes. Many related topics were discussed in historical, social and medical context. Among those were headaches, epilepsy, alcoholism, head injuries and other issues. Emphasis was made on fatal head injury- sustained by a number of famous people who made impact on history. Among those was Imam Ali Ibn Abi Talib peace upon him. The author did not find the cause of death which happened two days after injury and remaining conscious up to the last moment

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prior to death was convincing. It was decided to go in depth and study the circumstances and clinical picture and the possible causes of death.

The study of Imam's death was based on what was extrapolated from the historians' case the referred to eye witnesses and people war near the Imam and around during the event until his death nearly forty eight hours after injury.(6, 8, 22, 27.31, 36, 39)Imam Ali was struck by a poisoned sword on his head penetrating the skull and injuring the brain and meninges. (2,4, 8,10, 13, 15, 16, 17, 23, 24, 26,43) Upon studying historical literature and envisaging the clinical and medicolegal aspects that led to Imam Ali's death, there found reason to investigate and try to find out the most likely cause of death based on the authors' modest expertise in neurosurgery. What complicated the clinical picture was the accompanying poisoning inflicted through the poisoned sword, as to what was the real cause of death. This study is lined with study-

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ing life and death of individuals who changed the course of history. The list is too long and on the top of which were Prophet Moses, Prophet Jesus, peace be upon them; reformers such as Confucius and Buddha; scientists like Isaac Newton and Albert Einstein; politicians such as Lenin and Kennedy, musicians as Beethoven and Mozart, among others. (References in English 1-10)

A Summary of the History of Injury:

On the morning of the 19th of Ramadan in the Hijra year 40, which coincided with January, 8 of the year 661 A.D., Imam Ali Ibn Abi Talib, was hit on the head by the poisoned sword of Ibn Muljim al-Muradi who was from Kharigites, a rebellion sect of Islamists. Two days later, the Imam passed away (1-50).

Discussion of Condition:

The discussion was divided into three parts, with the first part being the head injury itself; the second. focused on the poison; and the third. dealt with other possible causes of death.

First: The Head Injury:

As we attempt to examine the event from neurosurgical, forensic and scientific aspects we will be confronted with several questions:

- Where was the position of Ibn Muljim when he struck Imam Ali?
 - In what position Imam's head as when head it was struck?
 - Was the Imam when struck walking or praying?
 - Was he bowing in prayer or, sitting or stood up?
- His level of consciousness after injury
- Uthair al-Sakuni, the doctor
- Was the Imam wearing a turban?
- What were the surgical details of the injury?
 - The Wound
 - The side of the injury
 - Where presumably was the wound located in the head?
 - The Skull Injury
 - Meninges and brain injuries
- What were the neurological functions after injury?

Where was the position of Imam when Muljim struck him?

Many historian agree that Muljim and his partner Shabib Ibn Bajra (1,2,3) were waiting for the Imam, who was on his way to the Kufa

What were the surgical details of the injury?

mosque for the morning prayer, when they attacked him. Ibn Bajra missed, but Ibn Muljim struck the Imam's head. (3, 30)

Some other historians stated that injury inflicted while Imam was during his morning prayers. (25,30,31,32,33)

Still other historians documented specifically that the Imam was in prostration, when sat up, and as he attempted to bow again Ibn Muljim struck him. (34) Or the Imam was in prostration, and when he raised his head from his second prostration he was struck on the head by the wielded sword. (8, 24, 30, 31, 33, 34)

All historians agree that the wound was at the front of the head, or the upper part of the head. (1,2,5,6,7,12,13,17,21,24,26,29,30,35, 36,37).

It was also said that the strike was on the forehead, (38) to one side. (18). And there were those who said he was struck on his bald spot. (31, 39)

Other historians confirmed that the wound was in the same place of the wound inflicted by Amr Ibn Wad al-Amiri when he was fighting the

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Imam in the Battlefield of *Khandaq* (627A.D.) 35 years earlier and struck Imam on his head.. (31, 33, 34,) Imam held his shield against Amr's sword which cut through the shield and wounded Imam's head. (8, 31, 33, 40)

State of consciousness:

At the time of injury:

When the Imam was struck, he did not lose consciousness but he immediately said: "I won by the creator of Ka'ba." (17, 19, 29)

Immediately after:

He then said, "Don't let the man escape." (2, 3, 4, 6, 27, 36) Or "You must go after him." (9,13,15,16,17,20,22,23,24,31,36,39,41) . Or "Jail the man."

At the residence:

He was then carried to his home. Visitors came to him and he praised God and gave advices to those around him (16):

The Imam said: "Get me the man". (9,10,13 ,15,16,17,20,22,23,24,30,31,36,39,41).

Afterwards, when Ibn Muljim was brought to him, Imam said to him: "Oh enemy of God what brought you to this?" (17, 21) Have I not treated you well? (26, 41). Then he said, "woe upon you for what made you do that?". (17,33)

He addressed him: "Brother of Murad, Have I been your worse leader?" (34) Then told him "a soul for soul". (18, 23,24)

Imam requested: "Make his food better, and his bedding softer. If I live an heir of my blood either forgiveness or take my revenge, but if I die, make him follow me. Do not be aggressive towards them because God does not love aggressors".)2, 5, 6, 27)

During the period of his injury:

Jundub Ibn Abdullah, one of close followers, entered to Imam's house to keep him company, who said," if we lose you, God forbid, we will pledge to your son al-Hasan". "I shall not", Imam said, "suggest to you as you know better of your affairs". He then called upon his sons Hassan and Hussein and said to them: "I bequeath you" and told them his will in a long speech which included: "Do not yearn for the world, and do not be seduced by it. Proclaim the truth; oppose the oppressor and support the oppressed. Remove your differences and to strengthen your ties. I heard your grandfather, peace be upon him, say: "Reconciliation of your differences is more worthy than all prayers and all fasting", ...If I die of this stab of his, kill him with one similar stroke. Do not mutilate him! I have heard

the Prophet, peace be upon him, say: "Mutilate not even a rabid dog." . (4,8,13,14,41) He said to whomever was in the house, "Did you send food to your prisoner?" (34) I said, "Is it true that after scourge comes prosperity?" He didn't answer me, Jundub said, and then Imam lost consciousness. Um Kulthum, his daughter, wept, and when he awoke, he said: "Don't hurt me, Um Kulthum, if you were to see what I can see, you would not weep." (42)

Next, al-Asbagh Ibn Nabata, an Imam's close followers, visited him and the Imam said: "Didn't you hear what Hassan said about my saying: no visiting?" He said to me, "Sit down, you will not hear from me a story after this." (50)

On the cusp of his passing:

When death approached he called for paper and ink, and he wrote, eloquently as ever, his will (2, 10, 23, 24, 34,40) stating: "In the name of God the merciful and compassionate, this is what I will... "O' people, everyone has to meet

I heard your grandfather, peace be upon him, say: "Reconciliation of your differences is more worthy than all prayers and all fasting",

what he wishes to avoid by running away. Death is the place to which life is driving. To run away from it means to catch it. How many days did I spend in searching for the secret of this matter, but Allah did not allow save its concealment. Alas! It is a treasured knowledge. ... Yesterday I was with you; today I have become the object of a lesson for you; and tomorrow I shall leave you. Allah may forgive me and you. My body kept you company for some days and shortly you will find just an empty body of mine which would be stationary after (all its) movement and silent after speech so that my calmness, the closing of my eyes, and the stillness of my limbs may provide you counsel, because it is more of a counsel for those who take a lesson (from it) than eloquent speech and a ready word." (17, 41)

After he completed his will, he said: "Peace and God's blessings upon you. Um Kulthum went to her father, and Imam said to her: "Close the door," which she did.." After which he only uttered the words "There is no God but God". (38) That was what he spoke last after he told Hassan what he wished, he repeated: "There is no God but God," until he died. (26, 43) It is said that the last words he spoke were: "He who does an atom of good will see good, and he who does an atom of evil will see evil."

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(26)

Hassan said: "As I was sitting at the door of the house, I heard the call of another person saying: "He who is thrown into hell." Hassan said, "better or he who comes secure in the Day of Judgment. I could not wait for the door to open as I entered, my father had passed away." (34)

From that all it was certain that Imam was alert up to the last moments prior to death.

Uthair al-Sakuni, the physician:

All historians agree physicians from Kufa were gathered and went to the Imam. (There were at that time about 150 physicians. (1,44) Not one was more knowledgeable of his injury than Uthair Ibn Amr Ibn Hani' al-Sakuni. He was a doctor who mastered surgery and allocated the title of "chair Physician". He was among the forty Christian boys who were taken by Khalid Ibn Walid in the battle of Ain al-Tamr 633 A.D.. And when Sakuni saw the wound of the Imam, he called for a hot sheep's lung and removed from it a vessel (according to the researcher the vessel must be a bronchiole and not the vessel commonly known as the vein or the artery). He blew into it and inserted it into the wound, and removed it. As he saw the brain white matter on its tip he

said to Imam, "Oh Prince of Believers prepare your legacy to the final will for the enemy of God struck your brain." Imam then called for a paper and ink and wrote his will. (2, 10, 23, 24, 43). One historian specified that Sakuni came to treat Imam the same day of the injury. (10)

Was Imam wearing a turban?

In those days Arabs generally wore turbans, especially during prayers. (25,45,46); Kufa physician Uthair al-Sakuni did not mention at the time of examination that there was any remnant of turban or foreign body in the wound, which is what would have happened had the injury been through a turban. Hence it was highly likely that the Imam was wearing a turban. Most likely the sword struck an uncovered area of his head and not through the turban itself.

Surgical Details of the injury:

The scalp wound:

The scalp injury bled heavily, and the Imam moved his head from side to side. (30) And the blood streamed to his beard. (26). Blood loss made him pale in the face. (47, 48) And according to Amr Ibn al-Hamiq: "I entered the room of Ali, where he was struck in Kufa, and

I said: 'It's not bad for you, it's just a scratch.'
Imam then said I am leaving you." (42, 43)

The side of injury:

None of historians mentioned that Ibn Muljim was left-handed. So as his sword was in his right hand, he confronted the Imam during the strike (3, 30). And because he was so fearful from Imam and his followers he did not wish to make a mistake in hitting the Imam, so he hit from where he was able to strike the head of the Imam as fast as he could in order to escape. Naturally the strongest path for the sword hit would be the vertical path in line of action of the right arm of Ibn Muljim. That meant the hit was on the left of the front side of the Imam's head.

Location of injury:

The head injury did not extend to the right side. Had the injury been leaning, or had it crossed the midline, it would have led to intracranial bleeding shown in red discoloration of the brain white matter which was not reported by al-Sakuni. (1,44)

A cut across the midline would have torn the Superior Sagittal Sinus which is a huge venous passage running from front to back in the midline of the head. (Figure 1) With the passing

of time collection of blood intracranially would have occurred causing progressive increase in the intracranial pressure which leads to rapid deterioration of level of consciousness and progressive weakness of the limbs and loss of consciousness which eventually ending in death.

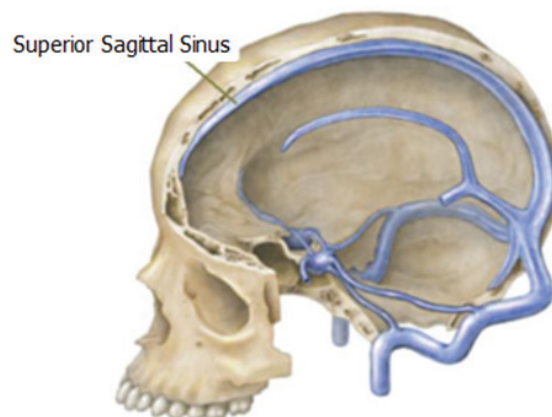


Figure 1: the superior sagittal sinus

Did the strike come at the lower forehead or directly above the eyebrow?

If that were the case, it would have injured the frontal sinus cavities that fall at the level of the eyebrows at the skull base. And here most often that resulted in some nasal bleeding from the injured sinuse that drains to the nose.. (figure 2) Nose bleed was not mentioned in the event other than bleeding which came from the scalp. Likewise the injury at the brow may generally result in local bleeding under

the skin, subgaleal, and ecchymosis and periorbital hematoma producing a “Black Eye”. None of that was reported by any historian.

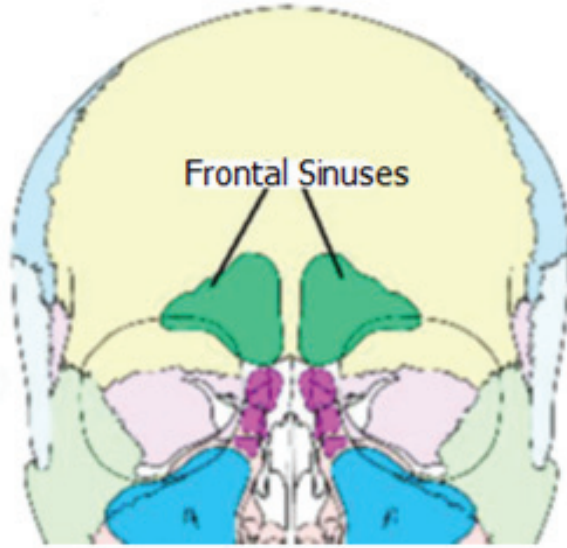


Figure 2: Frontal sinus

Did the injury occur high at the front the head?

If the injury was on the top of head then with the depth of brain injury as Uthair al-Sakuni, the physician mentioned (1, 44), it could have injured the motor strip of the cerebral cortex. (Figure 3) and when injured it results in some sort of weakness in the opposite arm or leg. According to the narrative of the historians, there was no mention of weakness of limbs or face at any time until time of his death.

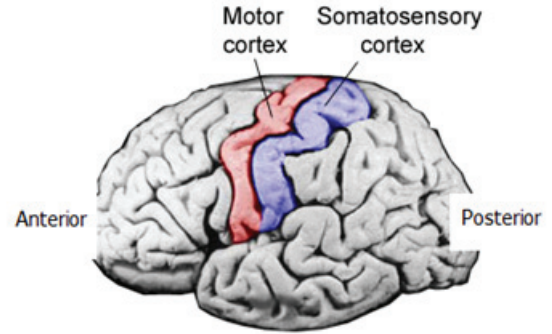


Figure 3: the motor strip of the cerebral cortex

Was there extensive bleeding?

It is, however, known that the scalp is generously supplied with blood vessels. (figure 4) There was not a clear idea about the intensity of bleeding from the wound at injury. One can therefore assume that there was significant blood loss. We learned that Imam’s head and beard were soaked with blood. (50)

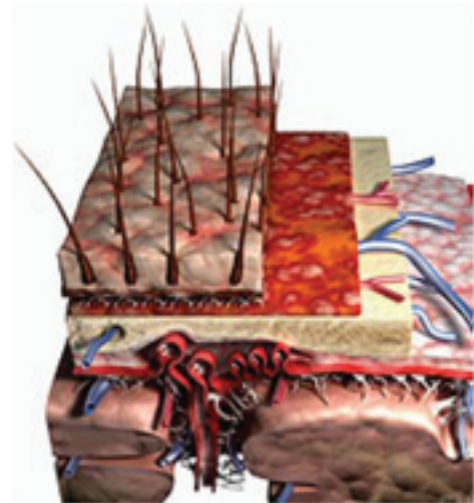


Figure 4: the scalp

The Skull Injury

It is certain that the sword had penetrated skull and reached the brain matter. That was concluded by Sakuni the physician when he inserted a “vessel”, a bronchiole, from a sheep’s lung into the wound and exposed the whiteness of the brain at the root he said: “Oh Prince of Believers, prepare your legacy to the final will.” (24)

Was the fracture of the skull large?

There is no doubt that the skull fracture exposed the white matter of the brain. But the fracture was not large, and as Sakuni was not able to see the inside of the skull and he was forced to insert the lung bronchiole, as a probe like, to the wound to explore the skull cavity and noticed pieces of white matter on its tip? Had the fracture been large, he would have been able to see directly inside the skull. The fracture width was the size of the width of the blade of the sword only.

Were the meninges torn?

Since we know the sword penetrated the brain matter, which indicates that the injury led to the tearing of the meninges which are three layer a membranes encase the brain all around. (Figure 5) That tear did not cause hemorrhage around the membranes as happens sometimes with such injuries; the

evidence is the absence of discoloration of the white matter of the brain by the blood.

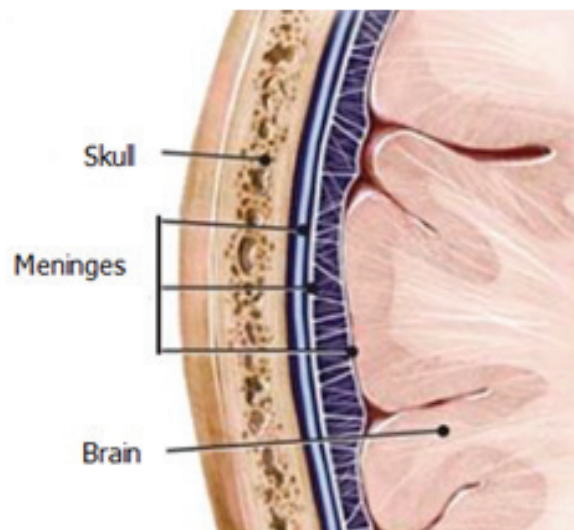


Figure 5: Meninges and related structures

The brain wound:

The sword penetrated the brain but not deeply. Had the sword reached deep into the brain it would have resulted in local bleed or penetration to the brain ventricles (Figure 6). Any of those would have resulted in a clinical picture characterized by headache, deterioration of consciousness and may be accompanied with some paralysis. None of that was referred to by historians. Hence we can assume that the depth of the wound within the brain matter did not exceed an inch or a little more.

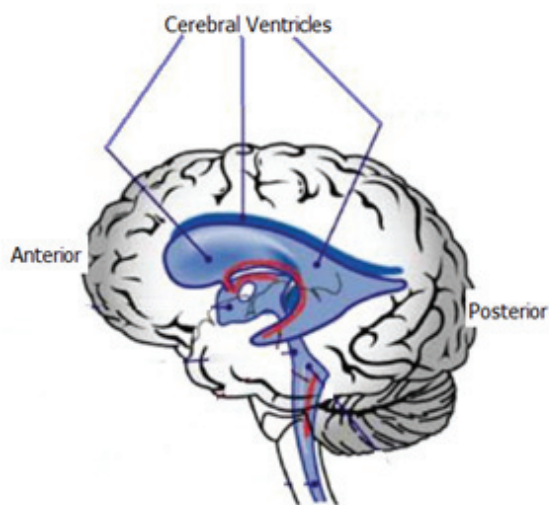


Figure 6: Cerebral ventricles

What was the neurological state after injury?

It is important to note the Imam was fully alert after the injury until his death except for episodes of fainting spells. He was so alert that he was able to issue his will and talk with his family and visitors in a manner not unlike his usual style when he gave speeches in the prime of his health, both in style and format. With that normal mental faculty there was no referral to any specific neurological dysfunction in the way of, headache, convulsion, nor visual disturbances nor limb weakness.

The first conclusion:

The strike was face to face as the Imam

was, at the time of the attack, walking upright. It was impossible that the Imam was seated or bowing in prayers at the time of the attack as some historians suggested, as such an attack would have resulted in an injury either to the very top of the head or at the back of the head and not on the front.

The wound was vertical and parallel to the midline on the left side on top of the forehead. Length of the wound was about two inches, and the depth of the wound was about one inch.

The second conclusion:

Was the head injury the cause of death?

The Imam was struck by a sharp sword that penetrated an inch inside the skull and brain matter. From what we have learned from history records, it was unlikely that there was meningitis or encephalitis nor a brain abscess because of the lack of expected complications in such conditions which includes fever, headache, deterioration or loss of consciousness on the cusp of death. The Imam, however, remained conscious until the final moment his sole left his body. It is also known that death from CNS infection occurs several days or weeks later, depending on the virulence of the causative germs that seep into the wound from the inflamed and infected skin

in or around the injured skin. There was no evidence of skin infection around the wound. One of those attending the Imam said: "Your wound was not significant. (42, 43) Also, there was no wound contamination coming from the turban, which could have caused chemical inflammation of the brain or cerebritis.

The final conclusion:

The head injury was not the direct cause of death

Second: Poison as a cause of death

It was certain that Ibn Muljim had poisoned his sword as he stated: "I poisoned it with a thousand (6 11, 30, 49)." "I bought my sword for a thousand, and I poisoned it with a thousand." (4, 8, 13, 15, 16, 17, 23, 24, 26) In other sayings, "Beware of the sword for it is poisoned." (29) And, "the poisoned sword." (22) And, "served him poison to drink." (14, 19) And at the Kaaba, they took their poisoned swords. (8, 4)

Methods used in poisoning the swords:

There were several ways of poisoning swords, include plating the sword directly with poison, poisoning the sword when manufacturing the weapon where long

grooves are engraved and plated by the poison. There was also the method of placing the poison inside the sheath so that the poison seeps into the sword with maximum effect. It is not possible to know which method Ibn Muljim used on his sword, we only know that he poisoned it "with a thousand" (English References 11-14).

A reference to the impact of the poison on him:

There was no clear indication of the impact of the poison on the Imam's health condition after he was stricken with the poisoned sword. We know only what al-Majlisi in *Bihar Al Anwar* bysaid: "He lifted a thigh and placed another from the intensity of the poison (50). Also in *Al Bid'a wal Tareekh*, which stated that the injury did not cause death, it was poison that had its effect. (31)

The kinds of poison and their impact:

Deadly poisons may enter the body through the mouth, by inhalation, or by blood or skin. In the case of the Imam, it is likely that the poison entered through the inflicted wound by the poison-impregnated sword of Ibn Muljim.

Historians at that time and place did not

refer to the types of poisons used nor means of poisoning swords. However, here we will look into the common poisons during that era and the impact on the body and how they resulted in death.

In the majority of cases, poisons that were used in and around those old days to coat weapons with were of three kinds: plant poison, animal poison, and mineral poison. (See list of foreign sources 11-14)

First; plant poisons such as:

1. **Digitalis plant:** It affects the heart directly by slowing pulse and render it irregular. It is to treat heart conditions nowadays but with very minute doses.



Figure 7: Digitalis plant

2. **Curare plant:** Acts on the nerve endings, resulting in paralysis in the muscles of the body. Native American Indians used this to coat their arrows for hunting to paralyze the prey. It is the basis for anesthesia in our modern era, in small quantities. (figure 8)



Figure 8: Curare plant

3. **Aconite plant:** This affects the nervous system and heart. (figure 9)



Figure 9: Aconite plant

4. **Strychnine plant:** This produces convulsions.



Figure 10: Strychnine plant

Second: Animal poisons:

Poisons taken from animals include snakes and scorpions and others.

Third: Mineral poisons:

Mineral poisons like arsenic and cyanide

Discussion:

Symptoms of poisoning with plant poisons are summarized. In poisoning by digitalis: the clinical picture includes; vomiting, purging, giddiness, cold sweats, convulsions, syncope and death. Then loss of consciousness develops caused by irregular and slow heartbeat. This does not apply to the case of the Imam who remained alert until the last minute

As for poisoning by Curare, the clinical picture includes escalating paralysis of the muscles of the limbs, neck and ultimately paralysis of swallowing and speech and then the respiratory muscles followed by death. Symptoms do not include loss of consciousness at the beginning. This also does not apply to the Imam whose limb movements were normal and was conscious with audible speech until the end.

Aconite's clinical picture begins on the tongue, which becomes heavy and perhaps paralyzed. Limbs become pale and cold with

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sweat. There will be abnormal movements which resemble epileptic attacks. Death occurs with the slowing of breathing and cardiac arrest preceded by a loss of consciousness and that does not apply in our case as well.

Exposure to strychnine results in events of convulsions and spasms in all the body and the feeling of strangulation. The body then develops severe contraction and pulls the head backwards. This is repeated intensely until death which is not the case here.

Poisoning by scorpion results in intense pain at the site of the entry of the poison, followed by fever, and difficulty swallowing and increase in saliva secretion. This is followed by muscle cramps and seizures resembling epilepsy, stopping in breathing, and then death.

Poison by snake depends on the kind of snake, but in most cases the patient feels increasing and intense weakness. He then feels sleepy and progressively weak and eventually develops paralyzed limbs. This is followed by bleeding under the skin or the gum, nose, urine, or per rectal. Speech becomes difficult as does swallowing and breathing. This is all preceded by loss of consciousness.

Cyanide poisoning causes difficulty breathing, seizures similar to epilepsy, loss of

consciousness, and death

Arsenic poisoning leads to headache and disorder in alertness. It also causes vomiting and diarrhea. The victim also acquired an odd smell resembling garlic, accompanied by intense pain in the stomach, and painful muscle cramps. The patient then suffers epileptic seizures, loss of consciousness and death.

In some cases of poisoning, final stages may be accompanied by deterioration of liver function and liver failure. These symptoms include intense yellow discoloration of the skin as jaundice. There was only one referral to yellow discoloration of Imam's skin. When Asbagh Ibn Nabata entered the room of the Imam, and noticed Imam's "yellow" face, he did not know which was more intensely yellow, the Imam's face or his yellow turban. (50) The yellow discoloration of the eyeballs, which is a sure sign of jaundice, was not mentioned at all. The yellow "Pale skin" mentioned was not repeated by any of those attending Imam, and also there was no coinciding medical signs to indicate any evidence of liver failure. which in such cases must be accompanied by loss of consciousness.

Conclusion:

None of the studied poisons' clinical pictures were seen in the Imam's case. Therefore it is not possible that death occurred as a result of the poisons discussed.

Third: Other possible causes of death

There are probably two other causes of death

The first is bacterial poisoning of the blood, septicemia: This usually occurs when the wound is infected by highly virulent microorganisms, which move through the bloodstream to cause deadly toxemia. Symptoms include vasodilatation and reddening of the skin especially limbs. However such bacterial poisoning is accompanied with fever and perspiration. Infection is visible at the point of entry, scalp wound. Local wound inflammation or pus formation and possible extension of infection to the very adjacent tissues, brain and meninges to produce inflammation of the brain and meningitis. Based on historians review none of what was mentioned was seen. Especially so what Amr Ibn Al Hamaq Al Khuzai said when he looked at the wound of the Imam: "Oh, Prince of the Believers, your wound is nothing!" (42, 43) This indicates that the wound was free of local obvious skin changes and also there was no mention of fever.

Conclusion:

The cause of death by bacterial poisoning is not a strong possibility.

The second possibility is heart and circulatory failure caused by hypovolemic state caused by loss of blood and dehydration. It was Ramadan and Imam was fasting in the preceding days prior to his injury and he had not drunk enough liquids that same day and the two days after. This caused reduction in cardiac output and lowering of blood pressure. This weakens the heart gradually until it comes to a standstill. However, it was not reported that the bleeding from scalp wound was streaming on the ground as, described in customary cases of heavy bleeding. We do know that blood colored his face, hair, and beard. (50) If we add the blood loss to the deprivation from water during fasting and not having anything to eat but for two or three bites "But few nights and the command of God arrives and I face God hungry. (12, 32, 39)

Ibn Al Ashaath said upon seeing the Imam: "I saw his eyes sunken in his head." Al Ashaath said: "The eyes of a head injury and by the Lord of the Kaaba." (4, 30) Sunken eyes are indicative of dehydration. All can account for real dehydration and hypotension.

Conclusion:

We assume that all these resulted in an significant hypovolemia and drop in blood pressure, weakening the heart intensely, but can we state that this is the cause of death?

The end: What is meant by cause of death?

It is known that death can be the outcome of direct or indirect causes. Direct causes include major and clear cut conditions like severe head injury, a car accident, or gunshot wounds, stroke or myocardial infarction and many other causes. As for indirect cause, for example the heart stops due to severe blood loss, so the direct would be the heart stopping, and the indirect would be the loss of blood or pulmonary embolism caused by thrombosis in leg vessels, the direct cause would be respiratory failure, and the indirect would be the clot in the leg veins. Also in case of death due respiratory failure in case of advanced colon cancer spreading to lungs the direct

cause of death is respiratory failure while cancer of colon is the indirect cause.

Final Conclusion:

From all evidences presented and studied we may be justified to conclude that the head wound was not the direct cause of death. The possibility remains that poison may have been the direct cause of death still holds true. If poison was the cause of death then it must be different from those mentioned in the study.

The real causes of death direct or indirect remain in need for further study, hoping to get more sources of information in the future.

At the end it is appropriate to refer to a quote from Avicenna that was always repeated by my teacher, the late Hussain Ali Mhfoudh: "We beg God to keep us from aversions that make us stumble upon dispositions with the wrong beliefs, and arouse admiration of what we see and do, and praise Him who grants the mind".

Notes

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