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WHAT IS JESUS CHRIST'S CAUSE OF DEATH?

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Abstract: There has been much speculation about the true *cause of death* of Jesus Christ, and this topic has been the subject of discussion by scholars all over the world. The aim of this text is to analyze some of the theories described by different authors about the possible causes of Jesus Christ's death during his crucifixion, without any kind of religious bias. Among the most plausible hypotheses are: asphyxiation, venous thromboembolism and hypovolemic shock. The aim of this review was to collect relevant data from the literature on this subject, which has not yet been elucidated.

Keywords: Asphyxia, Shock, Blood clotting, Jesus Christ, Death, Thrombosis.

INTRODUCTION

The death of Jesus Christ is a historical and religious event of great historical significance for Christians around the world. Although crucifixion is widely accepted as the final method of execution used in ancient Rome, there are debates and questions about Christ's actual *cause of death*. This narrative review of the literature on Christ's possible *cause of death* explores the different theories proposed by scholars, theologians and medical experts over time. The aim is to analyze the historical and medical evidence available to understand the circumstances that led to his death.

Without a doubt, prolonged agony, intense trauma, hemorrhage, water and respiratory restrictions are crucial factors that contributed to his death, but the final cause is still the subject of debate, and may have been hemorrhagic shock, pulmonary embolism, asphyxia, hemothorax, hemopericardium, arrhythmia, traumatic cardiac rupture, acute renal failure, rhabdomyolysis or pulmonary atelectasis. The fact is that, based on current knowledge, it is assumed that death was certainly multifactorial and the result of circulatory and cardiopulmonary collapse.^{1,2}

MATERIAL AND METHOD

For this review, we considered relevant publications in the PubMed, LILACS and SciELO databases from 1986 to 2023, in English, Spanish and Portuguese. The search terms death, Jesus and Christ were used in Portuguese and Spanish. Articles were selected from the databases, excluding those that were not related to the topic under investigation. After analytical reading based on the abstracts of the articles, we considered the works directly related to the probable cause of Jesus Christ's death, which were read for analysis of the criteria. In addition, we considered the books "The Passion of Christ according to the Surgeon" and "The Crucifixion of Christ described by a Surgeon", both by the French doctor Pierre Barbet (1884-1961), which were read in full for further background on the subject.

DISCUSSION

CRUCIFIXION AS A METHOD OF EXECUTION

Crucifixion is a method of execution originally applied in Mesopotamia and Persia and later used and perfected by the Romans, among other peoples.³ This practice was normally used as a form of punishment restricted to slaves, but over time it was also extended to prisoners of war, deserters, thieves and defeated rebels.⁴ In ancient Rome, it was considered the cruelest form of punishment offered to a non-Roman citizen and, today, it practically symbolizes the Roman Empire itself.

THE CHARACTERISTICS OF THE CROSS AS

The cross, as part of the crucifixion method, was a piece made up of two distinct parts: one fixed vertically, usually nailed into the ground, called *stipes crucis*, and the other movable, fixed horizontally over the first, known as the *patibulum*.⁵ It is estimated that the maximum height of the cross did not exceed 2.5 meters, being low enough to facilitate the crucifixion process and also to allow animals to tear the crucified to pieces.⁴

THE PRE-CRUCIFIXION RITUALS

In Rome, everyone condemned to death was cruelly scourged, regardless of whether they were crucified or executed in any other way.^{4,5} Exemption from this ritual was granted, exceptionally, to senators, soldiers or women entitled to Roman citizenship.⁴ The instrument used for this practice was known as a *flagellum*, which consisted of a short handle with thick strips of raw leather attached to one end, with lead balls or sheep bones at the ends.⁴ The *flagellum* was intended to weaken the condemned physically and morally before the actual crucifixion. The victim was tied behind his back and buttocks to a log or a kind of pole, probably with his hands over his head,^{5,6} stripped naked and whipped on the back, buttocks and legs.⁷

The anterior region of the chest was spared the blows to prevent cardiac death. Up to this point, bleeding was still not significant, as the blows applied were restricted to the skin and other soft tissues, preserving the arteries and veins.⁶

THE CRUCIFIXION PROCESS

After the scourging, the condemned man carried the *patibulum*, estimated to weigh between 34-57 kg, over his shoulder to the place where he was to be executed, over a distance of approximately 600m.^{7,8,9} There, he

was placed in a supine position and had his arms and legs driven with nails or tied to the wood by the wrists and ankles. It is speculated that the hands were not fastened, as they would not be able to support the weight of their own bodies for longer periods.³

After a while, a Roman soldier or centurion would usually deliberately break the crucified man's legs to cause his body to lose support, which would speed up his death by asphyxiation. The fracture of the long bones of the leg could also cause death by fat embolism.

Some authors claim that Jesus Christ was not subjected to this fracture, unlike the two other criminals who were crucified along with him (Dimas and Gestas), on the assumption that he was already dead at the time, making such a ritual unnecessary. The fact that his lower limbs were not fractured would reinforce the theory that Christ died suddenly while still on the cross.^{1,2,7}

THE HYPOTHETICAL CAUSES OF DEATH OF JESUS CHRIST

ASPHYXIATION

The vast majority of medical articles on the crucifixion of Jesus Christ state that asphyxiation was the final event in his death.¹⁰ His position on the cross, possibly with his arms raised for a long period of time, would have led to restricted movement of his ribs, which caused a state of hypoxemia, and consequently excitation of the muscle fibers and involuntary contractures of the large inspiratory and expiratory muscles (pectoralis major, sternocleidomastoid and diaphragm). As a result, Christ was theoretically able to fill his lungs with air, but was unable to empty them, since the inspiratory muscles are stronger than the expiratory muscles, which led to a situation similar to that of a patient with chronic obstructive pulmonary disease.^{3,4,8}

DEEP VEIN THROMBOSIS AND PULMONARY EMBOLISM

Some historians suggest that Jesus Christ could have had some genetic thrombophilia, such as factor V Leiden and/or the 20210 prothrombin mutation, for example. This condition is associated with Jewish populations, with a higher prevalence in the Galilee region.⁷ Based on this fact, the hypothesis has been put forward that a genetic predisposition, associated with dehydration and immobilization on the cross, could have caused a pulmonary embolism (PE) and, consequently, the sudden death of Jesus Christ while still on the cross.¹¹ A pertinent observation about this theory is the fact that this regional genetic profile did not necessarily occur some 2025 years ago and, therefore, this is really an assumption based on today's population profile, which is certainly much more heterogeneous than it was in the past.^{1,2}

In addition, the multiple and intense traumas in the ritual of the flagellum and its traumatic attachment to the cross could have activated the coagulation system through tissue damage via the tissue factor pathway (extrinsic pathway).⁷

One aspect that deserves to be emphasized is that any crucified individual, by remaining in an upright position and with immobile ankles fixed to the cross, has an increased risk of PE due to increased venous stasis, as a result of a decrease or loss of function of the lower limb aspiration pumps.^{4,7}

Another factor that could have contributed to sudden death from PE is hemoconcentration, secondary to dehydration, hemorrhage or hypovolemic shock.⁷

Therefore, Jesus Christ, during the crucifixion ritual, may have been exposed to the three components of the triad described by Rudolf Ludwig Karl Virchow in 1856¹², as the pathophysiological basis for an episode of PE: hypercoagulability, endothelial damage and venous stasis.

One fact that reinforces the hypothesis of PE as the *cause of death* is that according to some historical accounts, Jesus Christ was crucified for around three to six hours, when many others survived for up to four days, suggesting the possibility of sudden death.⁶ Of course, the question remains as to whether or not he was actually dead when he was taken down from the cross.

HYPOVOLEMIC SHOCK

Several facts contribute to reinforcing the hypothesis of hypovolemic shock as the cause of Jesus Christ's death. It is estimated that he was deprived of food or drink for a period of twelve hours between his last meal, the last supper, and his crucifixion, which could have led to dehydration.⁷ Associated with water deprivation, the scourging mentioned above certainly caused intense pain, hyperpnea and hemorrhage, which intensified his hypovolemic state.⁹

Some authors suggest that, on the eve of his crucifixion, Christ went through periods of intense agony that may have caused a rare condition called hematidrosis, which consists of intense dilation of the subcutaneous capillaries that rupture when they come into contact with the sweat glands of the skin. The blood mixed with sweat comes out through the skin pores, which is one of the possible contributing factors to their hypovolemia or shock.⁴

It's important to mention that in the Scriptures there are reports that at times Jesus Christ complained of thirst, which reinforces the idea that he could have been suffering from dehydration.¹¹

Other factors that may have contributed to dehydration and therefore led to hypovolemic shock would have been tachypnea caused by pain and physical stress and the ingestion of wine, possibly offered to relieve suffering, which would have caused an increase in alcohol-induced diuresis.⁷

TRAUMA-INDUCED COAGULOPATHY

In approximately 25% of trauma patients, a complication called trauma-induced coagulopathy (TIC) can be observed. CIT manifests itself mainly when several factors such as shock, tissue damage, hypothermia, metabolic acidosis and systemic inflammation are present simultaneously.¹³

Jesus Christ would certainly have suffered tissue lesions as a result of his scourging.⁶ These lesions can lead to the consumption of platelets and clotting factors, contributing to CIT. In addition, He would probably have been hypothermic, due to hemorrhage, peripheral vasoconstriction, dehydration and environmental exposure (He was naked on the cross), as well as being crucified in early spring, which was still a cold time in the Judean region.

Metabolic acidosis could be due to tissue ischemia sustained by hypovolemic shock.¹⁴

These three conditions (CIT, hypothermia and metabolic acidosis) are known as the “lethal triad”, which could justify his sudden death while still on the cross.^{14,15}

THORACIC AND CARDIAC TRAUMA

The scriptures mention that a Roman soldier raised a spear and pierced one side of Jesus Christ's chest, at the level of his heart. This act is called *longinus*, which refers to the word *lonche*, which means spear in Greek. This act was considered indispensable before the body was handed over to the relatives for burial, as it had to be certain that the crucified man was dead.^{4,5} If the spear hit the heart, there would be immediate death due to cardiac rupture and hemopericardium.¹¹

Some scholars assume that Jesus Christ was still alive at the time of the fatal blow with the spear, on the assumption that blood would not flow in a corpse and would have already clotted if he had still died on the cross. This possibility is reinforced by a passage in the New Testament which says that there was a sudden flow of blood and water after the piercing trauma caused by a Roman soldier's spear to Jesus Christ's right thorax.¹ However, from a medical point of view, we can't be sure that the piercing of his chest by the spear was the final event of his death, because there are doubts as to whether Christ had already suffered sudden death, by PE or fat embolism, for example, or whether he was in a comatose state, which would have confused the Roman soldier, inducing him to carry out the final act of execution. Therefore, there is no way of proving whether his death occurred before or after the piercing trauma caused by the Roman soldier's spear.¹

CONCLUSIONS

The sequential events that would have caused the death of Jesus Christ are based on historical accounts and the Scriptures, and are therefore subject to inaccuracies and religious biases. Asphyxia, hypovolemic shock and trauma-induced coagulopathy are the hypotheses classically accepted by scholars on the subject.

However, looking at some aspects of the crucifixion ritual to which he was exposed from an exclusively medical perspective, sudden death by PE, for example, cannot be absolutely ruled out. Therefore, the authors' opinions may vary and the debate on the subject will continue to arouse interest and research on the part of various scholars around the world.

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