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Review Article

What did Joseph Stalin really die of? A reappraisal of his illness, death, and autopsy findings

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ABSTRACT

Joseph Stalin was one of the most important world leaders during the first half of the 20th century. He died suddenly in early March 1953 after a short illness, which was described in a series of medical bulletins in the Soviet newspaper *Pravda*. Based on both the clinical history and autopsy findings, it was concluded that Stalin had died of a massive hemorrhagic stroke involving his left cerebral hemisphere. However, almost 50 years later, a counter-narrative developed suggesting a more nefarious explanation for his sudden death, namely, that a "poison," warfarin, a potent anticoagulant, had been administered surreptitiously by one or more of his close associates during the early morning hours prior to the onset of his stroke. In the present report, we will examine this counter-narrative and suggest that his death was not due to the administration of warfarin but rather to a hypertension-related cerebrovascular accident resulting in a massive hemorrhagic stroke involving his left cerebral hemisphere. The counter-narrative was based on the misunderstanding of certain specific autopsy findings, namely, the presence of focal myocardial and petechial hemorrhages in the gastric and intestinal mucosa, which could be attributed to the extracranial pathophysiologic changes that can occur as a consequence of a stroke rather than the highly speculative counter-narrative that Stalin was "poisoned" by the administration of warfarin.

Contents

1. Introduction

The 2018 satirical British film *The Death of Stalin*, directed by Armando Iannucci and based on the graphic novel of the same title by Fabien Nury and Thierry Robin [1], prompted us to reexamine the circumstances relating to J.V. Stalin's last days. His terminal illness, death, and autopsy findings first were reported in a series of medical bulletins

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in the Soviet newspaper *Pravda* and shortly thereafter in a complete English translation in the *Current Digest of the Soviet Press* [2].

Subsequently, his illness and health were described in varying degrees of detail in several books and articles [3–8]. However, it is well known that so-called "official" Soviet announcements may not reflect the truth and that they should be interpreted accordingly. As described by Volkogonov [3], on February 28, 1953, Stalin and a small number of his inner circle, consisting of Malenkov, Molotov, Beria, Khrushchev and several others, gathered together for an evening of entertainment and the imbibing of alcoholic beverages. The guests dispersed at approximately 4:00 a.m. on March 1, and Stalin retired to his private quarters. Time passed and no sounds were heard throughout the day, but adhering to his strict instructions that he was not to be disturbed under any circumstances, no one entered the room. Finally, at approximately 11:00 p.m. on March 1, his housekeeper cautiously entered his room and found him lying on the floor, wearing his pajama trousers and a shirt. He was unconscious, breathing heavily, incontinent, and unresponsive to attempts to rouse him. Lavrenti Beria, head of the "secret police" [the State Security Commissariat (NKGB)/State Security Ministry (MGB) and subsequently KGB [9]], was called and, upon seeing Stalin, attributed his unconsciousness to alcohol consumption during the previous night and departed. (See Figs. 1 and 2.)

Fig. 2. Death mask of J.V. Stalin (photo taken by R.F. Barth, State Stalin Museum, Gori, Georgia).

2. Clinical history

At 7:00 a.m. on March 2, Beria and a group of medical experts were summoned to examine Stalin. The most detailed medical description relating to the events that transpired between the discovery that Stalin was unconscious on the evening of March 1 and his death on March 5 has been provided by Volkogonov [3], quoting directly from the medical report of March 2, 1953, issued by the chief Kremlin physician I. Kuperin and Professors P. Lukomsky, I. Glazunov, P. Tkachev, and V. Ivanov-Neznamov, which follows below:

> During the examination, which took place at 7 AM, the patient was lying on a divan on his back, his head turned to the left, his eyes closed, with moderate hyperaemia of the face; there had been involuntary urination (his clothes were soaked in urine). While his pulse was being felt in the left radial artery, motor disturbances were seen in the left arm and left leg. [*Presumably this is erroneous since, if the stroke involved the left cerebral hemisphere, the motor disturbances would have involved the right arm and leg.*] The breathing was not irregular. The pulse was 78 with rare prolapses [*skipped beats*]. The heart tones were dull. Blood pressure was 190 over 110. There was no wheezing in the lungs from the front. There were signs of contusion in the area of the right ulna (excoriation and a small swelling). The patient is in an unconscious state. The right nasal–labial fold is slightly fallen. The eyeballs move to right and left when the lids are lifted. The pupils are of average size, with reduced response to light. There is no movement in the right extremities and occasional disturbance in the left.
>
> Diagnosis: hypertonic [*hypertensive*] disease, generalized atherosclerosis with predominant damage of the cerebral blood vessels, right-handed hemiplegia as a result of middle left cerebral arterial haemorrhaging; atherosclerotic cardiosclerosis and nephrosclerosis. The patient's condition is extremely serious.
>
> Treatment: absolute quiet, leave the patient on the divan; leeches behind the ears (eight now in place); cold compress on the head, hypertonic microclism (one glass of 10 per cent solution of magnesium sulphate). Remove dental prostheses. No food today. A neuropathologist [*presumably a neurologist*], therapist and nurse should be on duty round the clock. A teaspoon may be used with care to give liquid when there is no choking.

Fig. 1. Undated photo of J.V. Stalin, presumably taken some time in the 1940s (photo taken by R.F. Barth, State Stalin Museum, Gori, Georgia).

3. Course of illness

As described by Volkogonov [3], over the next 2 days, Stalin received a variety of treatments in order to decrease his blood pressure, which had risen to 210/120, including a second application of eight leeches that were placed on his neck and face, presumably to lower his blood pressure. However, his condition continued to deteriorate, he was still unconscious, and his breathing was uneven (suggesting Cheyne–Stokes breathing). On March 4, his breathing became more labored, and he was given oxygen at 2:30 p.m. At 11:30 p.m., he showed signs of wanting to vomit, his face and torso became pale, his pulse was rapid and irregular, and there were involuntary movements of facial muscles and jerking of his left leg. He was tachycardic with an irregular pulse. He received $MgSO_4$ by intramuscular injection and by enema. (The reasons for this are unknown, but it subsequently has been reported that it can lower arterial blood pressure and heart rate and improve left ventricular function [10].) An electrocardiogram revealed an "acute disturbance in blood circulation of the coronary artery accompanied by focal failures

of cardiac muscle," which strongly suggests that he had sustained an acute myocardial infarct. His condition continued to deteriorate; in the afternoon, his respiration became shallow, his pulse reached 140–150 beats per minute, and his pulse pressure dropped. He was pronounced dead at 9:50 p.m. on March 5, 1953. His body then was taken to the Kremlin Mortuary, and according to Volkogonov [3], an autopsy was performed by nine "specialists," and an 11-page autopsy report was prepared. Following the autopsy, the body was embalmed for public viewing in the Hall of Columns.

4. Autopsy findings

Our attempts to locate the original Russian autopsy report have been unsuccessful, but the most important autopsy findings were reported in a bulletin published in *Pravda* on March 7, 1953, as follows:

Pathological–Anatomical Examination of the Body of J. V. Stalin*

Pathologic examination revealed a large hemorrhage, localized to the area of subcortical centers of the left cerebral hemisphere. This hemorrhage destroyed important areas of the brain and resulted in irreversible changes in the respiration and circulation. In addition to the brain hemorrhage, there were found significant hypertrophy of the left ventricle (of the heart), numerous hemorrhages in the myocardium, in the stomach and intestinal mucosa; atherosclerotic changes in the vessels, more prominent in the cerebral arteries. These are the result of hypertension. The results of the pathologic examination revealed the irreversible character of J.V. Stalin's disease from the moment of brain hemorrhage. Therefore, all treatment attempts could not have led to a favorable outcome and prevent a fatal end.

Pravda, vol. 66, no. 1264, p. 2, March 7, 1953 (translated by S. Brodsky and M. Ruzic).

Additional information relating to Stalin's clinical course more recently has been described in a memoir by a prominent cardiologist, A. L. Myasnikov [11], who was one of the physicians taking care of Stalin. According to him, Stalin received hourly injections of camphora, strophanthin, caffeine, glucose, and oxygen and the application of leeches. His blood pressure was 210/110, and a white blood cell count was 17,000. On the morning of March 4, an electrocardiogram (EKG) was carried out by a young doctor who interpreted the results as showing that Stalin had had a myocardial infarct; however, this subsequently was ruled out by a group of more experienced physicians. On March 5, Stalin had an episode of blood-tinged vomiting, became hypotensive, and expired later that evening, following which an autopsy was performed. According to Myasnikov, an eminent Russian cardiologist [12], there was no evidence of a myocardial infarct but hemorrhages in the myocardium and petechial mucosal hemorrhages in the stomach and intestines. There was hemorrhage involving the left cerebral hemisphere and atherosclerosis of the cerebral vessels.

5. Stalin's brain

According to Martirosian, at the time of Stalin's autopsy, his brain immediately was removed, transported to the Moscow Brain Institute, and presumably fixed in formalin for future study [13]. According to Mironin's pro-Stalin revisionist book entitled *How Stalin Was Poisoned* [14], which attributed all of Stalin's crimes and misdeeds to others, he stated that, following the autopsy, his internal organs were preserved in formalin for 7 years, and then, except for his brain, they were eventually cremated. In April 2014, an American journalist, Joy Neumeyer, visited the Institute, which is now called the Brain Research Department of the Research Center of Neurology [15]. Neumeyer was interested in seeing the brains of a number of prominent Russians, including Lenin and Stalin. Her guide, Irina Bogolepova, Head of the Laboratory of Anatomy and Architectonics, was able to show her materials relating to the brains of a number of famous Russians, but she could not provide any information relating to Stalin's brain that purportedly was kept in a restricted part of the Institute [15]. In contrast, as had been reported earlier in the popular press [16], Lenin's brain was sectioned sagittally into 30,000 20-μm-thick sections that were sufficiently thin in order to allow for microscopic examination [17]. This was carried out by the eminent neuroscientists Oskar and Cecile Vogt, initially in Moscow in 1925 and subsequently in Berlin [16,17]. However, as best as we can determine, no one ever has reported on the neuropathologic findings in Stalin's brain and what studies, if any, were ever conducted on it.

Although there was nothing more than the brief bulletin in *Pravda*, which described the main gross findings of Stalin's autopsy, Hachinski has speculated that, based on Stalin's paranoia and his despotic character, he might have had multiple previous cerebral infarcts, both lacunar and secondary to atherosclerosis [18]. However, Stalin had a number of other significant risk factors including a longstanding history of hypertension and smoking [19], which are known to be significant risk factors for the development of cardiovascular disease [20]. In addition, he may have been subjected to stress associated with his paranoid personality disorder [18].

6. Discussion

The prevailing view has been that Stalin had died of a massive stroke, until 2002 when Brent and Naumov [21] suggested a more nefarious explanation for his death based on the pathologic findings of hemorrhage in the gastric and intestinal mucosa (or, as described by Myasnikov, petechial hemorrhages [11]) and focal hemorrhage in the myocardium [11]. More specifically, Brent and Naumov speculated that Lavrenti Beria, either alone or with accomplices, surreptitiously had added the potent anticoagulant warfarin, or possibly a warfarin-containing rodenticide, to Stalin's drinks during the night of his stroke. There are a number of problems with this alternative scenario. First, warfarin was discovered, synthesized, and evaluated at the University of Wisconsin. It initially was marketed in the United States as a rodenticide sometime in 1952 [22] but would have required repeated ingestion to produce its toxic effects in rats. Warfarin did not receive approval from the Food and Drug Administration for human use until 1954, and therefore it would not have been readily available before then [23]. Second, based on this, it would have been difficult, if not impossible, for Beria to obtain warfarin in March 1953 even if he had known that it was a potent anticoagulant. A more likely explanation for the gastrointestinal (GI) petechial and myocardial hemorrhages is that they were stress related, secondary to the prolonged time interval between the onset of his stroke and his death. Third, patients who had warfarin-related intracranial hemorrhages much less frequently have significant GI hemorrhages. In the case of Stalin, only petechial hemorrhages were seen in the GI tract [11].

As summarized above, rather than suggesting a "plot" by Beria, who purportedly at one point had told Molotov "I took him out" [4], whatever that meant, including his willful delay in obtaining medical treatment for Stalin, we believe that these changes were consistent with extracranial changes that can be seen in stoke victims. As quoted by Sergo Beria, his son, his wife purportedly told Lavrenti Beria after Stalin's death, "Your position now is even more precarious than when Stalin was alive." [24]. Ironically, she was correct, and several months later in June 1953, Beria was arrested and charged with a variety of crimes but, significantly, none relating to Stalin's death [25]. He subsequently was executed at the order of his former Politburo colleagues, but there are conflicting stories as to when and where this occurred [24,25].

Quigley and Keating [26] were the first to cast doubt on Brent and Naumov's speculation that Stalin had been poisoned and, subsequently, Faria's suggestion that Stalin had been poisoned by the administration of warfarin [5,6]. Quigley and Keating [26] suggested that, if indeed Stalin had hematemesis, this could have been attributed to a stress ulcer in

the gastric mucosa or possibly a Mallory–Weiss tear in the esophagus, which has been reported to occur following hemorrhagic strokes [27]. However, these were not described in the brief autopsy report [2] or by Myasnikov [11]. Furthermore, they provided an alternative explanation for the myocardial hemorrhages based on a report describing cardiac muscle hemorrhage in the subendocardium following intracerebral hemorrhage due to a complex mechanism by which a rapid rise in intracranial pressure could result in bradycardia and hypertension. This could lead to a sudden elevation of left intraventricular pressure resulting in subendocardial anoxia with a concomitant increase in capillary fragility, thereby resulting in myocardial hemorrhages [28]. These characteristically are seen within 12–24 h of an acute myocardial infarct, which initially was diagnosed following an EKG but subsequently dismissed by more experienced physicians [11]. Another possible explanation for the EKG findings could be myocytolysis secondary to the oversecretion of norepinephrine at the interface of nerves and myocytes. This also might explain the "acute disturbances of cardiac muscle" and the EKG abnormalities that were mentioned in the medical bulletin.

At one point, we entertained the possibility that the focal myocardial and GI hemorrhages, which we subsequently learned were petechial [11], could be attributed to the two applications of eight leeches each, which presumably were applied to reduce Stalin's blood pressure. Leeches secrete the most potent, naturally occurring anticoagulant, hirudin, which is a direct thrombin inhibitor, and possibly other antithrombins [29] that can result in excessive bleeding at the site of their attachment. However, based on a recent review on hirudiniasis [30] and a conversation with the author [31], leech bites will not significantly alter coagulation pathways, and any bleeding that does occur would be at the site of their attachment. Based on this, we have dismissed the application of leeches as a possible explanation for the focal myocardial and the GI petechial mucosal hemorrhages. On the other hand, disseminated intravascular coagulation (DIC) has been described as a complication of ruptured intracranial aneurysms [32] and of subarachnoid hemorrhage [33]. Although DIC was not even described in 1953, we cannot exclude the possibility that this might have occurred and provides another possible explanation for the myocardial and gastrointestinal hemorrhages and history of blood-tinged vomiting [34,35].

7. Conclusions

In conclusion, Brent and Naumov [21] and Faria [5,6] have speculated that warfarin had been administered to Stalin during a night of drinking alcoholic beverages during the evening prior to his stroke. This was based on the reported autopsy findings of focal myocardial hemorrhages — hemorrhages which in reality were petechial and GI mucosal — that led them to speculate that Stalin had been poisoned by the administration of warfarin. Rather, we suggest that these were extracranial consequences of his stroke and the prolonged time interval between the stroke itself and his death. The indisputable immediate cause of Stalin's death was a massive hemorrhagic stroke involving the left cerebral hemisphere, rather than so-called "poisoning by the administration of warfarin."

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Declaration of conflicting interests

The authors declare that there is no conflict of interest.

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Note added in Proof

Following submission of the final version of our manuscript we were able to obtain a copy of the original Russian language Autopsy Report and a detailed Medical Log summarizing the medical treatment of Stalin. The latter will be the main subject of a future report.

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