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by

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Abstract

When Napoleon Bonaparte's empire fell for a second time, there was much justified worry that he would once again return to claim France; thus he was exiled to St. Helena, far off in the Atlantic Ocean where he eventually died. Because many believe that the then new French government would have supported an assassination attempt, historians and scientists have pondered over Napoleon's death wondering if they have unearthed a great murder mystery. The matter is still under debate in the literature today.

Up to the 1960s, Napoleon's death was accepted as the outcome of familial gastric cancer as diagnosed at the original autopsy by the independent accounts of numerous physicians. This evaluation was cast into suspicion when his obesity at death was pointed out, leading to further studies attempting to show a weight loss in Napoleon's dying days. Also, in 1960, Napoleon's hair was analyzed showing arsenic levels consistent with poisoning. This led to a race to correlate reported symptoms and disease course with the arsenic findings. At this time the debate began to heat up, with papers published outright attacking other authors' work. Advocates for the assassination theory generally believe that after the "cosmetic" arsenic poisoning to mimic a longstanding disease, Napoleon was quickly finished by the administration of lethal levels of calomel with orgeat. Supporters of the cancerous death theory refute the ability of hair arsenic levels to distinguish environmental or cosmetic arsenic from ingested arsenic.

With the most recent publications in 2007, this debate is still hotly discussed. There is little controversy regarding the gastric cancer at autopsy, but much less is clear when discussing the cause of death. My paper will review the findings so far in an attempt to evaluate which explanation is most plausible.

Napoleon Bonaparte is one of history's most recognizable names, physiques and characters from his days as a general and emperor, but his illnesses and death are still under debate. There are two major trains of thought supported to this day: one that he

died of a gastric cancer as diagnosed at original autopsy, and the other a much more sinister tale of poisoning and assassination from those most dear. When his empire fell for a second time, there was much justified worry that he would once again return to claim France; thus the British exiled him to St. Helena, far off in the Atlantic Ocean where he eventually died. Because many believe that the then new French government would have supported an assassination attempt, historians and scientists have pondered over Napoleon's death wondering if they have unearthed a great murder mystery. In 1961, technologic advances threw gas on the fire of this debate when it was shown that strands of Napoleon's hair contained marked elevations in arsenic concentrations. This, along with an account in his dying days of strong overdose of a potentially lethal but commonly used treatment at the time, has garnered support for the assassination believers. Of course, with any debate both sides have their claims to disprove the opposing theory and make those who subscribe to it seem foolish. Today we will start with "old faithful," the gastric cancer theory.

To begin, an understanding of Napoleon's health and symptoms must be understood. Bonaparte suffered from illness throughout life, leaving much for current authors to speculate and publish on based on observational records of his appearance and behaviours. Popular topics have included his seizures, were they epileptic or psychogenic, and his jaundice with conjunctiva "as yellow as a lemon," which is of interest as this was the result of advanced gonorrhea causing chronic uremia due to multiple kidney infections from a narrowed urethra. This is important in the discussion of the gastric cancer as a state of chronic uremia can lead to fatigue, weakness, nausea, vomiting, malaise and anorexia, which are similar symptoms to those attributed to his gastric cancer. Also, this is a cause of cardiac arrhythmias, which is felt to be the probable cause of death according to the assassination theorists. Interestingly, numerous publications in the literature blame both a long term arsenic poisoning or a medication overdose for putting him into Toursade de Pointes and later cardiac arrest, but none seem to consider the possibility that a chronic uremic state predisposed Bonaparte to hyperkalemic cardiac arrhythmias, which was aggravated by acidosis induced by a hemorrhage from his gastric ulcer.

Dr. Jean-François Lemaire, a historian expert in Napoleonic history and medical doctor, pieced together the clinical picture of Napoleon's final years and published it in his book, *Autour de l'empoisonnement de Napoleon* – Around the poisoning of Napoleon. This account, which seems to be universally accepted by both sides of this debate, breaks Bonaparte's deterioration into five phases. The first three are commonly lumped together to occur between October 1815 and September 1820, the fourth between September 1820 and February 1821 and the fifth phase finishing with his death in May 1821. Generally, one can think of these phases as phases one through three involve chronic gastritis with ulceration, phase four involves gastric cancer, and phase five involves the deterioration associated with advanced gastric cancer.

In the early phases, Napoleon was largely asymptomatic until January 1819, after which he began to complain of severe epigastric pain, right scapular pain, nausea, and headaches. Also, his physicians documented vomiting, paleness, diarrhea, constipation, fever, chills, and jaundice with dark urine, of which the latter three were associated with a postmortem finding of a "distended gall bladder containing very thick and lumpy bile." It is interesting to note that nowhere in most publications does it mention Napoleon's chronic uremic state, which surely would have played a role in exacerbating these symptoms.

The fourth stage brought persistent abdominal pain, nausea and vomiting, dysphagia, constipation, night sweats, fever, progressive weakness and weight loss. Notably, he developed an aversion to meat, which is a clinical observation in many cancer patients. Observers also noted that "his pulse is weak, his gums, lips and nails are colourless." This progressed into the final stage of his deterioration as his night sweats then required changing clothes several times each night. He also experienced a strong abdominal pain present everyday, a fever most days, hematemesis, melena, and tachycardia. He died at 51 years of age.

Dr. Antommarchi, a pupil of the famous University of Siena Anatomy Professor Giuseppe Mascagni, performed an autopsy the day after Napoleon's death on May 5th, 1821. One thing that all sides of the debacle can agree on is the competency of Dr. Antommarchi, in fact, a line appears in almost every paper written on the subject praising his exceptional competency as a pathological anatomist despite his unenviable personality. His findings included extremely pale skin and a pale hemorrhage-less heart, tuberculous lesions of the left lung, several enlarged, necrotic mediastinal and bronchial lymph nodes, a modest bilateral pleural effusion, enlarged liver and spleen and most importantly severe gastric pathology. An official report by Drs. Shortt, Arnott, Mitchell, Burton, and Livingston describe the gastric pathology,

> Upon opening the abdomen the omentum was found remarkably fat, and exposing the stomach that viscus was found in the seat of extensive disease, strong adhesions connected the whole superior surface, particularly about the pyloric extremity to the concave surface of the left lobe of the liver, and on separating these, an ulcer which penetrated the coats if the stomach was discovered one inch from the pylorus sufficient to allow the passage of the little finger. The internal surface of the stomach to nearly its whole extent was a mass of cancerous disease or scirrhus portions advancing to cancer, this was particularly noticed near the pylorus. The cardiac extremity for a small space near the termination of the oesophagus was the only part appearing in a healthy state.

Also, in other accounts it was noted that the stomach and colon were filled with a coffee ground like dark material, the classic description of a gastric hemorrhage, and a second smaller ulcer at the adherence to the liver. The perigastric lymph nodes were hardened, enlarged, and some were necrotic. Important negative findings, for the purposes of this disagreement, are the absence of hyperkeratotic lesions in the skin of the hands and feet, normal nails, no other tumors and an absence of relevant urinary bladder or kidney pathology.

Surely this fits with the clinical picture of a gastric cancer; most agree, but a major stumbling block thrown out by those in the assassination camp is the observation that Napoleon died in an obese state. Several rebuttal papers address this issue with an attempt to show a large weight loss as Napoleon's disease progressed by approximating his BMI using linear fits based on waist circumference and subcutaneous fat thickness. In these analyses, extrapolation of Napoleon's weight at death may be questionable, but the marked decrease in waist circumference of his trousers as he approached death speaks strongly to his cachectic state at death. Also, the subcutaneous fat analysis seems to project to a similar BMI at death as the waist circumference data.

As any beginning medical student knows, with a diagnosis of cancer, you've got to ask about a family history. Those interested in this debate have found a significant risk with Bonaparte's father ailing to gastric cancer and allegedly his grandfather and five of eight siblings as well. This seems to be attributable to familial achlorhydria, but there is no evidence of this other than the frequency of gastric cancer in this family and the longstanding symptoms of gastric pain throughout life, which accounts for the typical Napoleonic pose in all his portraits with his hand over his stomach beneath his coat to relieve the associated pain. Others believe these longstanding gastric problems to be more consistent with a chronic *Helicobacter pylori* infection, which would also account for the second small ulcer found on autopsy.

As with everything about Napoleon's death, this autopsy isn't without controversy either. Antonmarchi performed his autopsy in the presence of 17 observers, of which 7 were English doctors. The three days following the death, Antonmarchi, Sir Thomas Reade, and Dr. Thomas Shortt filed independent autopsy reports. These reports were remarkable in their agreement of the findings in the autopsy and are generally considered accurate by those researching the subject, at least in their inclusions but not in their exclusions. Where controversy begins, two years later a Dr. Walter Henry published another account of the autopsy. Its turns out that he refused to sign the report by Dr. Shortt two years earlier, but no one is aware as to the reason, and his account included a few findings not earlier included. One of which was feminization with genital atrophy. Where things get seedier, Antonmarchi published a second account of the autopsy in 1825 with additions to his original account, such as abdominal lesions and pathology consistent with tuberculosis in the left lung. While this is suspicious enough, where the real trouble lies is in the similarity of this account to a publication by a Dr. Rullier in the *Archives générales de médecine* two years earlier. Sections of these papers are exact duplicates, suggesting not just inadvertent inspiration for the later account, but a simple cut and paste job! If anyone were still to give Antonmarchi a bit of a benefit of the doubt, there is reason to believe he must have read this 1823 account. In the same edition of this journal there was an article praising his anatomical competence, which he surely would have taken the occasion to read. There is much speculation about why Antonmarchi would plagiarize an autopsy he himself performed, but little is known other than it was not due to inadequate skills with the French language.

Now we delve into the much more interesting theory, the assassination of the great French Emperor, Napoleon Bonaparte. This theory, which originally debuted in the book, *The Murder of Napoleon*, was written by Dr. Sten Forshufvud and Dr. Ben Weider, who is the president of the International Napoleonic Society and continues to crusade for this idea. Their concept of Bonaparte's cause of death involves chronic arsenic poisoning over years to illicit a "cosmetic phase" to Napoleon's illness, followed with a "lethal phase" of medication overdose.

The fundamental finding that this theory resides on is the high arsenic concentrations found in his hair in 1960. Before his death, Napoleon had made a few requests, one of which were that he would undergo an autopsy as he was concerned that his death would be of familial gastric cancer, which would plague his children. Another was that his hair be cut and distributed to family members as a memoir. Absorption analysis studies were performed on various samples of this hair and the findings of these studies showed a varied arsenic concentration with time and hair. Dr. Weider published a paper correlating the elevations in arsenic levels at a given time with bouts of illness and low levels of arsenic with remissions. He also pointed out that a peak concentration was found to be greater than three times that of the current alert level for arsenic poisoning. Supporters of the assassination theory, proclaim that the correlation between Napoleon's illness and hair arsenic concentrations prove that this was indeed a poisoning and not a case of external contamination, which would be expected to be uniform throughout the hair. Finally, Napoleon's body was exhumed in 1840, when it was noted that his skin was bronze and his body was very well preserved, both of which are known effects of high arsenic levels.

Those who disagree with this theory largely do so based on the lack of evidence that this was indeed an arsenic ingestion and not simply external contamination. To begin, the presence of peaks and valleys in arsenic concentrations along the hair does not exclude external contamination. In fact it has been shown that this is precisely the pattern one will get with external contamination by dipping hair in an arsenic solution. This external source could be a number of things, such as coal smoke, drinking water, cosmetics, and preservatives. In fact, adding a touch of arsenic was a well-established preservation method for cut hair. Also, wallpaper-related arsenic poisoning was well known as far back as the 1890s. In fact, Napoleon's wallpaper at St. Helena was Scheele's green, a mixture of copper arsenides which, under the influence of certain moulds likely to be present, can become volatized.

Also argued is the significance of the findings as they rely on only a few hairs. Usually, hair is sampled in larger amounts from several sites on the head and this mean correlates approximately with degree of toxicity. Because little remains of the Bonaparte hair samples and the value of these remains, the analysis of arsenic concentrations has typically been done on very small samples, and for this reason these results must be taken with a grain of salt. Finally, typically to make a diagnosis of arsenic poisoning, one needs a certain clinical set: peripheral neuropathy, weight loss, raindrop pigmentation to the skin and elevated hair arsenic levels. Ideally this is

accompanied with a skin sample, which is not possible in this case. Napoleon did not demonstrate the associated skin changes nor the peripheral neuropathy, leaving the only two signs he did exhibit weight loss and hair arsenic levels, which can adequately be explained by the gastric cancer theory with external contamination of the hair.

As for the "lethal phase," there is much agreed upon by all camps. All agree that Napoleon was administered a tartar emetic, orgeat, and then a very large dose of Calomel. As claimed by the assassination theorists, after the tartar emetic was administered, Bonaparte vomited and cleared his stomach, increasing his ability to absorb the medications to follow. The orgeat was then administered as a thirst quencher and contains glycosides of cyanide, which are hydrolyzed to hydrocyanic acid in the stomach. This is proposed to have reacted with the large dose of Calomel, the mercury chloride containing medication of choice for constipation, to produce mercury cyanide, which is lethal. This large dose was in fact forty times that of the standard dose. He then soon fell unconscious and lost control of his voluntary muscles including those needed to swallow, a feature common to mercury cyanide poisoning. He died soon after.

Many argue that Calomel was used extensively up to 1950 and is not absorbed. This is true, in that the inorganic mercury in Calomel is known to be largely unabsorbed, but this large dose of a gastrointestinal irritant could have been the last straw to push Bonaparte's hypokalemia to a level which would induce Toursade de Pointes. Some even argue against this as mercury was found only in normal levels in Napoleon's hair samples, but one would expect that hair growth between the administration of this medication and when the sample was taken, the day after his death, would be minimal. While some authors claim the hair to be cut at the scalp, others document their observations to be that the hairs "did not seem to have been cut very close to the scalp;" thus, this argument seems to be weak at best. They also argue that hydrocyanic acid is as lethal as mercury cyanide, thus, the large administration of Calomel should not be more lethal and Bonaparte had been given orgeat on numerous occasions in the past without this result.

The motivations for this assassination seem to be evident in literature. The British and new French governments feared Napoleon would return to make their lives difficult; thus, putting an end to him would have been an attractive plot. Though there were also fears of the repercussions of this action; if France's beloved great emperor was assassinated then great riots and civil unrest would occur to destabilize the back on the scene Bourbon government. For this reason these governments would have to use an assassination method that would appear unquestionably to be a death of natural causes. This is where the "cosmetic phase" comes in, a long-term arsenic poisoning would make Napoleon progressively sicker, imitating an organic disease preluding his death, and was essentially undetectable at the time.

If he was poisoned intentionally, the running theory on how this occurred is that Montholon, Napoleon's closest aide and wine steward for his private collection, would largely be the key suspect poisoner by placing arsenic in the Emperor's wine. Not only was he in the perfect position to pull off this assassination, he had many personal interests in Napoleon's death. To begin with, Napoleon left him two million francs. Also, Bonaparte has allegedly admitted to an affair with his wife, Albine, resulting in the conception of her illegitimate child. Also, Montholon later wrote her in a note that "Calomel would soon end his gardening efforts." This came about when it was Montholon who persuaded Antonmarchi, Napoleon's physician, to give the Calomel without the knowledge or consent of the Emperor. Additionally, after refusing to sign the commemorative sketch of Napoleon's death with his companions at his side, he wrote, "I have closed the eyes of the world's greatest Captain." Finally, Albine's memoirs support the identity of the assassin.

At times this debate in literature seems to have more intent on making the disagreeing authors look foolish than to definitively prove how Bonaparte met his demise. This is easily neglected when sorting through the literature, but the real trouble comes where readers are often left confused with contradictory tales recited from comrades of the late emperor; not something a reader can exactly look up in a journal article to verify. One example of this, albeit a minor point, is many papers throw in the aside that only Napoleon himself predicted his death; however, some papers cite this prediction to be "of the same disease as his father-cancer of the stomach," others cite the chronic uremia with his own words "this is my weak spot. It is by this I shall die," and finally some others cite, "I die before my time, murdered by the English oligarchy and its hired assassin." More glaring contradictions are found as well, for example, in the presence of distant metastasis at autopsy. It is worthy to note that most papers state that there is no controversy in this matter.

After all is said, it seems that Napoleon's cause of death will never be proven. The evidence points certainly to his dying with gastric cancer and, possibly but not necessarily, of gastric cancer. Although the arsenic poisoning theory is an attractive and very interesting one, the evidence does not seem to support this fantasy. As for the "lethal phase" to Napoleon's assassination, this situation seems much more probable, but is still simply a matter of speculation with some evidence to support it. The only thing that seems for certain about this subject is that publications around it will continue.

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