The botulinum toxin legend of Reinhard Heydrich's death

The end of "Himmler's brain"

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ABSTRACT

The high-ranking German Nazi Reinhard Heydrich (1904–1942) was one of the main organizers of the mass murder of Jews during the Second World War. He died on June 4, 1942, in Prague after having been wounded in Operation Anthropoid planned by the British intelligence services. Since the 1970s and 1980s, Heydrich's death has been frequently presented in British, American, and French literature as the consequence of a bacteriologic attack. Botulinum toxin would have been used in the grenades or ammunition. We discuss the botulinum toxin hypothesis using the now declassified British archives of Operation Anthropoid and of the chemical and bacteriologic warfare centers to assess this hypothesis. ***Neurology*® 2017;89:84–87**

GLOSSARY

SOE = Special Operations Executive.

Reinhard Heydrich (1904–1942) was a high-ranking German Nazi in the Third Reich and one of the main actors of the Holocaust (figure 1). His complementarity with the Reichsführer Heinrich Himmler (1900–1945) earned him the nickname of HHhH (Himmler's Hirn heisst Heydrich [Himmler's brain is called Heydrich]). In 1939, Heydrich became head of the Reichssicherheitshauptamt (Central Reich Security Office), regrouping all the intelligence and police services of the Third Reich. He created the Einsatzgruppen (special action groups), mobile killing squads involved in the massive execution of Jews. In January 1942, he was officially entrusted with die Endlösung der Judenfrage (final solution of the Jewish question) and conducted the Wannsee conference.

On June 4, 1942, Heydrich, as Reichsprotektor of Bohemia-Moravia, died in Prague 7 days after having been wounded in an attack, the *Operation Anthropoid,* organized by the Special Operations Executive (SOE), a British intelligence service.

Since the 1970s and 1980s, Heydrich's death has been frequently presented as the consequence of a bioweapon attack. In particular, some publications claim that botulinum toxin was present in the grenades or ammunition used in Operation Anthropoid.[1–4]

In this article, we discuss the botulinum toxin hypothesis using the now declassified archives. A few are retained and we obtained authorization to access them. We studied relevant records in the British National Archives concerning both the attack itself and Porton Down, the British chemical and bacteriologic warfare center, to assess this hypothesis with objective information.

OPERATION ANTHROPOID During the night of December 28–29, 1941, Jozef Gabčík (1912–1942), a Slovak, and Jan Kubiš (1913–1942), a Czech, both trained in Great Britain SOE establishments, were air-dropped near Prague. Their goal was to organize Heydrich's assassination with the help of local resistance fighters.

The details of Operation Anthropoid are now available in the British National Archives[5,6] and in some publications.[7,8] On the morning of May 27, 1942, Gabčík and Kubiš were waiting for Heydrich's car along the road between Heydrich's home and his quarters in Prague Castle. At approximately 10:35 AM, Josef Gabčík jumped in front of the vehicle, holding a Sten machine gun, which, however, failed to fire. Heydrich ordered his driver to stop the car, pulled his pistol, and shot at Gabčík. Then Jan Kubiš pulled out one of the specially prepared grenades from his briefcase and tossed it at the car. After the explosion, apparently unconcerned by his

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Figure 1 Reinhard Heydrich in 1940

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shrapnel injuries, Heydrich tried to chase Gabčík, but soon collapsed. Gabčík and Kubiš succeeded in escaping but they died 3 weeks later in an assault on the church where they had sought refuge.

SURGICAL PROCEDURE AND DEATH Heydrich was driven to the Bulovka Hospital and reached the emergency room around 11:00 AM. Dr. Vladimir Snadjr arrived first and discovered a deep wound.[9] Dr. Slanina also examined Heydrich before the arrival of Prof. Walter Dick (1899–1990), the Sudeten German chief of surgery. He observed a wound of 10 cm in the left paravertebral region at the level of the 8th to 10th thoracic vertebrae. An X-ray showed a left pneumothorax, a fracture of the 11th rib, and a metal fragment in the spleen.[10]

Heydrich consented to be operated on by Prof. Josef Hohlbaum (1884–1945), a Silesian German, head of surgery department at Prague Charles V University. The operation started around noon. Dr Alois Vincenc Honek (1911–2002) was asked to assist because he was acquainted with the British anesthesia equipment.[11]

During the procedure, Dick and Holhbaum resected part of the fractured 11th rib, inserted a catheter in the pleural cavity, and observed that the abdominal cavity was filled with blood. The spleen was removed. It contained an 8 × 8 cm grenade splinter and fragments of car upholstery. Pancreas was sutured and a drain was inserted in the peritoneal cavity before closing the abdomen.[11]

Heydrich's health improved rapidly in the days following the surgical procedure. Nevertheless, on June 2, Heydrich developed a 39°C fever and the drainage volume of the wound increased. On the morning of June 3, Heydrich's temperature dropped and he seemed to be on the mend. However, at noon, he suddenly collapsed and sank into a deep coma. He died at 4:30 AM the next morning.

THE AUTOPSY Heydrich's autopsy took place at noon on June 4, 1942. It was performed by the pathologist Herwig Hamperl (1899–1976) and the forensic pathologist Günther Weyrich (1898–1998), both professors of the German Charles V Institut in Prague. For 40 years, Heydrich's autopsy report was thought to be lost, but the original report, written in German, was published in 2003,[12] and was subsequently commented upon.[13–15] The autopsy was incomplete. The brain and the cervical region were not autopsied. No toxicologic analysis was performed. A preliminary conclusion was given just after the autopsy:

> Death came after harm to internal organs (heart, liver, kidneys) through intoxication by probably highly virulent microorganisms. Neither the thoracic, nor the abdominal cavity showed accumulation of pus…There is no point for suspicion of some special poisoning by the metal splinter.[12]

The final report was issued 13 days after the autopsy. The main observations were several collections of pus-like fluid around the diaphragm with a fibrin-encapsulated frill of hair. Blood thrombi were found in the pulmonary artery, surrounded by conglomerates of fat droplets and associated with an atelectasis of the left lower lung. Biological examinations of drained pus found nonhemolytic *Streptococcus*, *Staphylococcus*, and *Proteus*.[12]

In 1970 and 1972, Herwig Hamperl came back to this autopsy and claimed that the site of the wound debridement was free of infection and that Heydrich probably died of anemic shock or shock due to grenade explosion.[10,16] Reading Heydrich's incomplete autopsy report, the main hypothesis concerning the cause of death is a pulmonary embolism with heart failure in a condition worsened by infection.[14,15]

ORIGINS OF THE HYPOTHESIS OF A BOTULINUM TOXIN ATTACK The idea of the potential use of botulinum toxin in the attack that killed Heydrich dates back to the 1970s. This hypothesis was first mentioned in 1971 by Julian Perry Robinson,[4] who claimed that Heydrich died "some hours after

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receiving a flesh wound from a bullet containing botulinal toxin." The hypothesis was then developed more clearly by Robert Harris and Jeremy Paxman in 1982.[3] It is based on statements by the English bacteriologist Paul Fildes (1882–1971):

> According to his own account, Paul Fildes made his most spectacular contribution to the second World War on 27 May 1942 on a street corner in Prague in Czechoslovakia…Although there is no official confirmation, by 1941 it appears that Fildes had succeeded in turning botulinum toxin into a weapon.[3]

Fildes added: "Heydrich's murder was the first notch on my pistol."[3]

In 1999, Michael R.D. Foot[17] (1919–2012), an SOE officer during the Second World War, clearly dismisses the hypothesis of a bacteriologic attack. In his major 1989 book on the Heydrich assassination, Callum A. MacDonald[7] (1947–1997) also dismisses this inconsistent statement riddled with inaccuracies and supported by no documentary evidence.

Despite a lack of evidence, the idea of the use of botulinum toxin in the attack against Heydrich was revived, mentioned, and disseminated on several occasions.[1,2,4,18] This rumor is still present in current publications.[19]

DISCUSSION The assumed botulinum toxin attack needs to be discussed with objective facts and documents that may confirm or invalidate this hypothesis developed in British, American, and French literature. A botulinum toxin attack is not addressed in German documents and publications. The main German report was written by Heinz Pannwitz (1911–1975), chief of the Gestapo in Prague. He did not mention any poison or toxin, even in the grenades that had been left at the site by Gabčík and Kubiš.[20,21]

From a semiologic point of view, as already noticed by several authors, the absence of diplopia, dysphagia, general muscular weakness, or respiratory insufficiency speaks against botulism in Heydrich's death.[18,22] Moreover, 2 other persons were wounded by the grenade. Jan Kubiš, who threw the bomb, was hit on his face. He exhibited no sign of botulism before Nazi troops killed him 3 weeks later. A woman was also injured by a grenade fragment but did not develop clinical signs of botulism and lived for many years afterwards.[9]

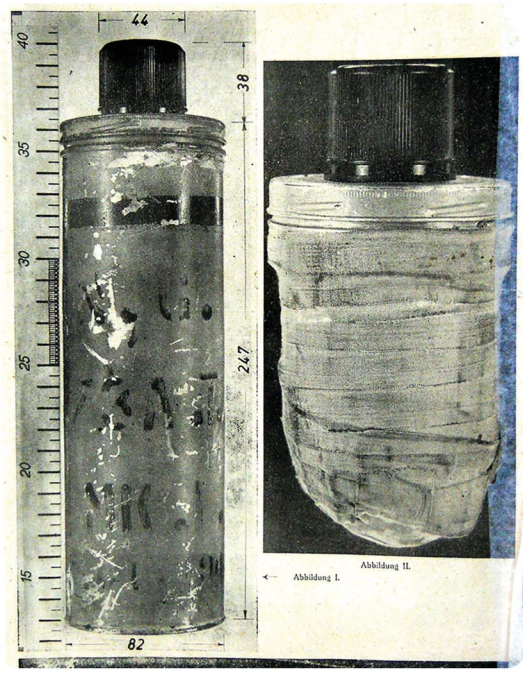
The main argument supporting the notion of a bacteriologic attack is the modification of the British no. 73 anti-tank grenades used in Operation Anthropoid: "It now seems that they had been personally prepared by Fildes at Porton, and each contained a lethal filling of BTX."[3] A photograph of one of the grenades left behind by Gabčík and Kubiš shows that it had been modified[5]: The lower two-thirds of the grenades had been removed and the whole grenade was wrapped with adhesive tape[7,22] (figure 2). Files in the British archives help us to understand this point. The grenade modification was not made at Porton Down. These special explosive charges were designed by Major Cecil Vanderpeer Clarke (1897–1961) and finalized by Captain Leslie John Cardew Wood (1898–1990) at Station XII (Aston House near Stevenage, UK), one of the SOE establishments where Gabčík and Kubiš were trained.[5] The aim of this transformation was to cut the size and the weight, which would make the device lighter and easier to handle.[23] Its purpose was not to introduce toxin in the grenade. Moreover, it seems unlikely that lethal botulinum toxin would have been prepared simply with adhesive tape for a night drop from an aircraft.[7,22]

According to the records, grenades were not aimed at killing Heydrich:

> The first bomb was to be thrown by N°1 at the front of the car when it came within 15 yards in order to kill the driver and so force the car to stop. The second bomb was then to be thrown broadside to hit the rear window, the panel just behind it or the rear door. Simultaneously N°2 would open up with the Sten gun.[5]

The attack did not occur as planned and Heydrich was hit by the second bomb, which was aimed at the rear window of the car. Moreover, Heydrich should have been killed during the attack: "No

Figure 2 **A standard British no. 73 anti-tank grenade (left) and a modified grenade (right) used in the Heydrich attack**



This photograph is part of a German police report (June 2, 1942)[5] (British National Archives; with permission).

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attempt at withdrawal should be made or considered until Heydrich had been successfully liquidated."[5]

The botulinum toxin hypothesis is based only on the publication of Julian Perry Robinson, in 1971, and the statements of the bacteriologist Paul Fildes cited by Harris and Paxman in 1982. We contacted Robinson about this point and he explained that his statement was not based on a reliable account (personal communication, 2016). According to him, an American biologist working at Camp Detrick, the American bacteriologic warfare center, in 1942, assumed that botulinum toxin produced at that time was sent to SOE for clandestine weapons during the planning of the assassination of Heydrich. In his 1971 publication, Robinson speculates that bullets were tipped with botulinum toxin. Actually, the tests concerning contamination of rifle bullets with bacteria only began in Porton Down in March 1942 after Gabčík and Kubiš had been air-dropped in Bohemia–Moravia.[24]

Fildes was appointed as a member of the Porton Down Bacteriologic Warfare Committee in November 1940.[25] Nevertheless, the relationship between Fildes and SOE was really effective from the spring of 1942 after the departure to Prague of the men of Operation Anthropoid.[26]

Fildes was known for his boasting and his exaggerations: "He enjoyed the sensation that he produced."[27] Gradon B. Carter, who had been working at Porton Down, confirmed this personality trait: "Paul Fildes undoubtedly had a quirkish sense of humor but why he should have invented a role in the Heydrich assassination is not clear."[28]

AUTHOR CONTRIBUTIONS

Laurent Tatu: study concept and design, acquisition of data. Wolfgang Jost: revising the manuscript for intellectual content. Julien Bogousslavsky: study concept, revision of manuscript for intellectual content.

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DISCLOSURE

L. Tatu is speaker and consultant for Allergan, Merz, and Ipsen. W. Jost is speaker and consultant for Allergan, Merz, and Ipsen. J. Bogousslavsky serves as chief editor of *European Neurology, Frontier in Neurology and Neuroscience*, *Case reports in Neurology,* and as guest editor of *Cerebrovascular Diseases*. Go to Neurology.org for full disclosures.

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