

# Franklin D. Roosevelt. A silent enemy and the course of history

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This manuscript is dedicated to the memory of Dr Federico González Dorrego, founding member and first president of the Society of Neurology of Extremadura and Professor of Neurology at the Universidad de Extremadura.

This study was the subject of a lecture at the 39th Zafra Medical and Surgical Conference, under the title "Reflections on cerebrovascular disease. Operation Argonaut."

## ABSTRACT

**Introduction.** The 32nd president of the United States, Franklin D. Roosevelt, died of a massive brain haemorrhage on 12 April 1945, at his home in Warm Springs, Georgia. He was thought to have enjoyed excellent health, and there had been no public perception that such a thing was likely to happen.

**Development.** Scrutiny of the medical data now available reveals the ignorance of some of the president's physicians, or the fact that his precarious health was knowingly concealed from the public. This review analyses elements of Roosevelt's cardiovascular and cognitive health from a historical perspective, drawing from the available biographical data and taking the Yalta Conference as a historical reference.

**Conclusions.** Arterial hypertension is highly prevalent, treatable, and controllable, for which reason it has emerged as a potentially modifiable risk factor for declining cognitive function. Many years after Roosevelt's death from neurological catastrophe related to hypertension, high blood pressure continues to be the most prevalent cerebrovascular disease risk factor, and the greatest population attributable risk. It is still necessary to develop effective blood pressure monitoring programmes, helping to ensure primary prevention of stroke and cognitive impairment.

## KEYWORDS

Arterial hypertension, brain haemorrhage, cognitive impairment, Franklin D. Roosevelt, mortality, pathobiography, stroke

## Introduction

By February 1945, the Second World War was losing momentum and the defeat of the Axis powers had become inevitable. The small coastal town of Yalta in the Crimean peninsula was to be the setting of a historic conference.<sup>1</sup> As the Third Reich fell helplessly behind, besieged by the British and Americans to the west and the Soviets to the east, three political leaders

were to decide Europe's fate. Joseph Stalin, Franklin D. Roosevelt, and Winston Churchill knew in early January 1945 that the war was won, but they were yet to secure victory and establish peace. The meeting was to be held in early February. Churchill proposed Argonaut as the codename for the operation; Stalin decided upon Yalta as the venue for the meeting (Figure 1). A week later, Hitler had retreated to the Führerbunker, from which he would not emerge alive. While the Yalta talks did include



**Figure 1.** Winston Churchill, Franklin D. Roosevelt, and Joseph Stalin sit for press photographers at the Yalta Conference in February 1945.  
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the planning of certain strategically important military operations, the three leaders were less concerned now with the war than with the future of Europe, and the fragility of peace. Yalta marked the birth of a new world order, with the United States and the Soviet Union taking the initiative; in some sense, it was the beginning of the Cold War. The decisions made at Yalta altered Europe's destiny for decades; their consequences continue to be felt today.<sup>2,3</sup>

Churchill, Roosevelt, and Stalin each had different manifestations of cerebrovascular disease, no doubt due to their lifestyles and the accumulation of vascular risk factors.<sup>4</sup> However, the disease was particularly cruel, and presented particularly early, in the case of the American president. At such a historic moment, an enemy unknown to Roosevelt (and perhaps to some of his physicians) was silently at work, planning a devastating personal attack against a vital organ: his brain. This lethal attack

would determine the president's future. The identity of this hidden enemy: arterial hypertension. In this review, we perform a historical analysis of certain elements of Roosevelt's cardiovascular and cognitive health, based on the available biographical data.

### Development

Franklin Delano Roosevelt (1882, Hyde Park, NY-1945, Warm Springs, GA) was the only US president to win four presidential elections. His political career, which began in 1910 with his election as New York senator, was marked by health issues, affecting mainly the cardiovascular system, but also other systems.<sup>5</sup> In 1921, while swimming in Maine, Roosevelt was struck with intense fever, symmetrical ascending paralysis, facial paralysis, bladder dysfunction, and paraesthesia with a descending pattern of recovery. He was diagnosed with poliomyelitis,<sup>6</sup> but his symptoms were more consistent with Guillain-Barré syndrome, as shown in



**Figure 2.** Roosevelt in a wheelchair, with his granddaughter and his dog Fala (1941). FDR Presidential Library & Museum, photograph by Margaret Suckley. Public domain image

an excellent 2003 study by Goldman et al.<sup>7</sup> Roosevelt's physical disability was well known before and during his presidency, and became an important part of his image (Figure 2).

In 1932, at the age of 50, he defeated Herbert Hoover to become 32nd President of the United States, with 57.4% of the popular vote.<sup>8</sup> That same year, the candidate's campaign office published medical records showing arterial blood pressure of 140/100 mm Hg; this did not give rise to any medical intervention.<sup>9</sup> At the time there was a patent lack of understanding of cardiovascular disease and the potential effect of the classic risk factors recognised today.<sup>10,11</sup> For this reason, the president-elect selected Admiral Ross McIntire, an otorhinolaryngologist, as his personal physician, as headaches and sinusitis were his main health concern.<sup>12</sup>

From 1935 to 1941, the president's blood pressure gradually rose from 136/78 to 188/105 mm Hg.<sup>13</sup> Despite this, Admiral McIntire insisted that the president was healthy and that his blood pressure was "no more than normal in a man of his age."<sup>12</sup> Roosevelt's physical

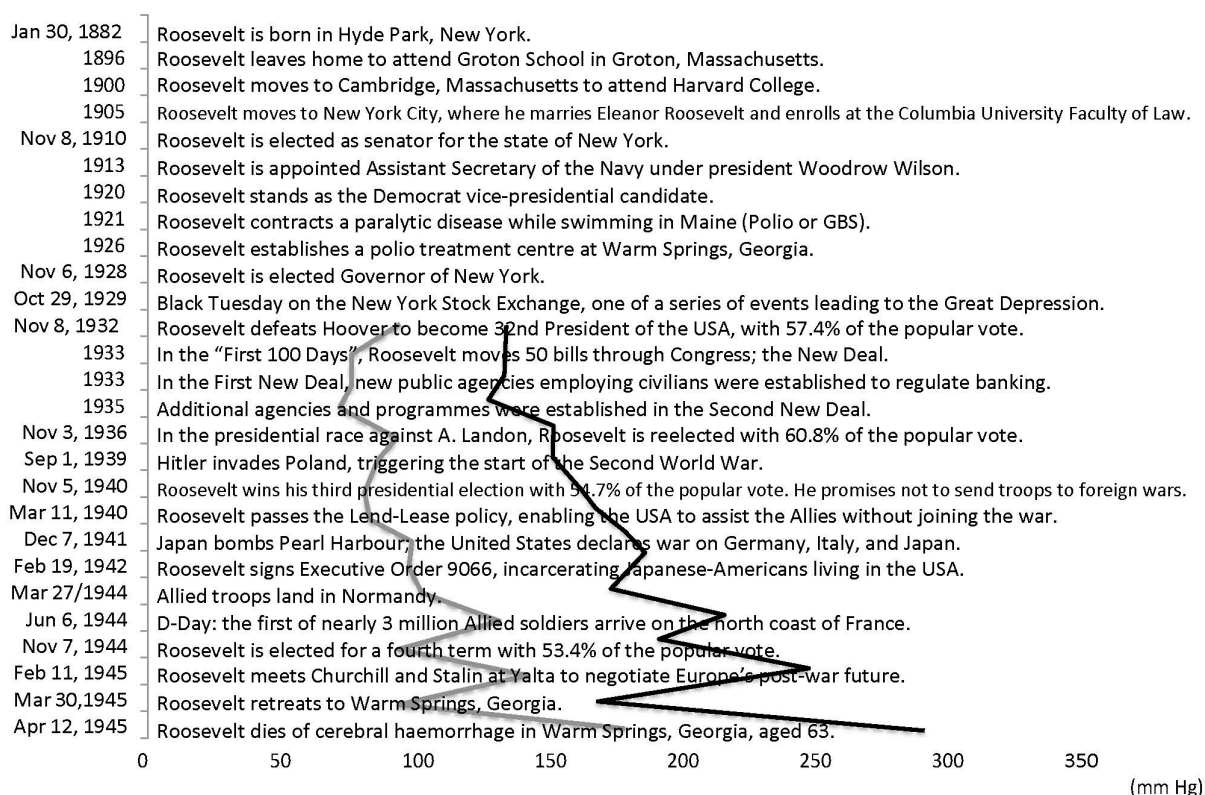
condition continued to deteriorate over the following years, becoming evident to certain colleagues and politicians. For example, when the British prime minister Winston Churchill visited the White House in May 1943, he asked his own physician, Lord Moran, if he had "noticed that the President is a very tired man."<sup>14</sup>

Today, there is growing interest in the physiological changes brought on by stress and their possible role in the development of vascular disease.<sup>15</sup> Based on the available epidemiological evidence and biological plausibility, people affected by chronic stress are now thought to be more susceptible to developing arterial hypertension at younger ages, and therefore more vulnerable to stroke.<sup>16</sup> Figure 3 shows the way in which Roosevelt's gradually increasing blood pressure tracks the intensity of political events. This may support the hypothesis that stress played a role in the president's arterial hypertension.<sup>17</sup>

On 27 March 1944, as Roosevelt prepared for the Normandy landings, his daughter Anna, concerned about her father's health, insisted that he seek a second medical opinion. The president was admitted to Bethesda Naval Hospital for exertion dyspnoea, diaphoresis, and abdominal distension. A committee of several physicians, including Admiral McIntyre, Dr Howard Bruenn, Dr James Paulin, Dr Frank H. Lahey, and Captain John Harper, performed a thorough examination of the president.<sup>11,18</sup> Bruenn, one of the country's few cardiology specialists, was particularly important. The young cardiologist diagnosed Roosevelt with "hypertension, hypertensive heart disease, and cardiac failure,"<sup>13</sup> based on clinical observations, findings of proteinuria, and X-ray and electrocardiography findings,<sup>19</sup> and proposed treatment based on bed rest, digitalis therapy, a reduced-salt diet, and reduced tobacco use.<sup>20</sup> The president's blood pressure remained high throughout 1944, reaching 200/100 mm Hg in November, when he won his fourth presidential election against the Republican Thomas E. Dewey with 53.4% of the popular vote. Immediately before the Yalta Conference, in February 1945, Dr Bruenn recorded blood pressure values of 260/150 mm Hg.<sup>19</sup>

For many of the president's colleagues and the politicians around him, it was clear in these last years that the president was not well, with both his heart and his brain being affected.<sup>21</sup> On 18 August 1944, Roosevelt's vice president Harry S. Truman said after a meal together that "I had no idea he was in such a feeble condition. In pouring cream in his tea, he got more cream in the





**Figure 3.** Timeline showing various representative developments in Franklin D. Roosevelt's political career; superposed on the timeline are blood pressure data, expressed in mm Hg (black line, systolic pressure; grey line, diastolic pressure). GBS: Guillain-Barré syndrome. Data from references 8, 17, and 19.

saucer than he did in the cup. [...] Physically he is going to pieces."<sup>22</sup> On 24 August 1944, when receiving the president of Iceland, Roosevelt gave his welcome speech twice, without noticing his mistake.<sup>22</sup> On 20 December 1944, former vice president Henry Wallace declared that Roosevelt was no longer of sound mind.<sup>22</sup> In January 1945, General Murphy, chief civilian adviser to Eisenhower, said that "the president is in no condition to offer balanced judgement upon great questions of war."<sup>22</sup> Charles Bohlen, Roosevelt's interpreter at Yalta, said in February 1945 that "our leader was ill at Yalta."<sup>23</sup> Also at Yalta, Churchill's physician Lord Moran commented, almost prophetically, that "to a doctor's eye, the president appears a very sick man. [...] I give him only a few months to live" (Figure 4).<sup>22</sup> Many of these situations describe neuropsychological alterations compatible with vascular cognitive impairment, which can be summarised as

follows: 1) short-term memory impairment, 2) decreased concentration and attention, and 3) executive function impairment and potential dysfunction. It is difficult to assess whether the president's mental health could have led to diplomatic or political mistakes affecting the Yalta negotiations, although some authors do argue that, at least during his last term, he displayed clear cognitive impairment.<sup>21,24</sup>

Examinations performed on the president were a state secret; findings may have been disclosed only to a small number of people and concealed even from family members.<sup>23</sup> In his memoir, president Roosevelt's son James recalls how "none of us was warned that Father's life might be in danger."<sup>24</sup> Some of Roosevelt's physicians may also have misjudged the severity of his condition; statements of his good health may not, therefore, have been fabricated for purely political motives. While



**Figure 4.** Roosevelt in conversation with Churchill at the round table in the conference room in Yalta. The other delegates had left the room. © IWM (NAM 185)

Roosevelt was closely monitored by Dr Bruenn over the last year of his life, it was McIntire who issued the press releases on the president's health.<sup>25</sup>

One spring day after the Yalta Conference, Roosevelt sat for a portrait by the artist Elizabeth Shoumatoff in the sitting room at his retreat in Warm Springs, Georgia, accompanied by his mistress Lucy Mercer, two cousins, and his dog Fala. According to Roosevelt's biographer Doris Kearns Goodwin, at around one o'clock in the afternoon the president suddenly complained of a terrible occipital headache, then fell unconscious.<sup>26</sup> Dr Bruenn remarked that Roosevelt had awoken that morning with a mild headache and neck stiffness.<sup>9</sup> Bruenn immediately realised that the symptoms were compatible with massive brain haemorrhage; he measured the president's blood pressure, which was 300/190 mm Hg.<sup>13</sup> Just two and a half hours later, the physicians at Warm Springs declared the president dead; his last words were "I have a terrific headache."<sup>27</sup> President Roosevelt died at the age of 63 on 12 April 1945, a few weeks after the Yalta Conference, as predicted by Lord Moran.<sup>22</sup>

President Roosevelt was a heavy smoker (more than 20 cigarettes a day); tobacco use has also been identified as a powerful risk factor for arterial hypertension.<sup>28</sup> Although no autopsy was performed, the embalmers commented that "the arteries were so severely plugged with plaques that the [formaldehyde] pump strained and stopped"; they were forced to perform successive injections first of the carotid, then the axillary, and finally of the femoral arteries.<sup>29</sup> It is beyond doubt that Roosevelt must have had severe, extensive arteriosclerosis.

In a period of only 10-12 years, Roosevelt's hypertension gradually worsened, eventually becoming malignant and causing a fatal cerebral haemorrhage.<sup>30</sup> The fact that hypertension was not considered a disease of great clinical importance in 1945 comes as no surprise. Numerous highly prestigious physicians of the day considered it "essential" for forcing blood to the target organs through sclerotic arteries.<sup>31</sup> Indeed, in an article on the significance of arterial hypertension, published in 1931 in the prestigious *British Medical Journal*, John H. Hay remarked that "the greatest danger to a man with a high blood pressure lies in its discovery, because 'then some fool is certain to try and reduce it.'"<sup>10</sup> Dr Paul Dudley White wrote in 1937 that "hypertension may be an important compensatory mechanism, which should not be tampered with, even were it certain we could control it."<sup>31</sup> The first antihypertensive drugs were introduced in the early 1950s.<sup>32</sup>

As part of the Public Health Service Act, the Roosevelt administration set up a department known as the Hygienic Laboratory, which was soon renamed the National Institute of Health. After Roosevelt's death, Truman promoted the creation in 1949 of the National Heart Institute, a special department dedicated to the study of cardiovascular disease, leading to one of the most significant contributions to epidemiology in the field: the Framingham study.<sup>33,13</sup>

Arterial hypertension causes remodelling of the entire arterial system. Specifically, it causes significant adaptive and degenerative structural changes to blood vessels. These include atherosclerosis, arteriolosclerosis, arterial wall thickening, reduced arterial lumen, and smooth muscle hypertrophy.<sup>34,35</sup> The secondary effects affect brain tissue in the form of microbleeds, silent strokes, ischaemic leukoencephalopathy, and atrophy.<sup>36</sup> One of the most important scientific discoveries of the past decade was the role of white matter involvement (a

sign of subcortical small vessel disease) in cognitive impairment and loss of functional capacity.<sup>37</sup> In the brain, arterial hypertension usually involves prefrontal-subcortical circuits, causing deficits in abstraction, formulation of objectives, and executive function.<sup>38,39</sup> From the perspective of anatomical pathology, diffuse white matter injury is the most frequent consequence of subcortical small vessel disease; this is generally more severe in frontal and occipital regions.<sup>40</sup> Affected white matter regions display myelin and axon loss, and chronic inflammatory infiltration; a recent study has also observed axonal damage.<sup>41</sup> In a study into diffuse white matter injury, Skrobot et al.<sup>42</sup> identified six characteristic pathological changes that predict cognitive impairment: 1) arteriolosclerosis, 2) perivascular space dilation, 3) leptomeningeal cerebral amyloid angiopathy, 4) microinfarcts, 5) lacunar infarcts, and 6) large infarcts. Today, brain magnetic resonance scanning offers greater insight into subcortical small vessel disease, with standardised criteria for quantifying damage in accordance with the pathological changes described by Skrobot et al.<sup>43,44</sup>

There is clear evidence that Roosevelt suffered arteriosclerosis, which would have resulted in peripheral artery stiffness.<sup>29</sup> Arterial stiffness is increasingly recognised as an important risk marker of cerebral ageing and dementia, due to its association with cerebral small vessel disease, stroke,  $\beta$ -amyloid deposition, cerebral atrophy, and cognitive impairment.<sup>45</sup> It is directly associated with peripheral organ damage caused by hypertension, which has disastrous consequences for the extensive microvessel structure of several organs, particularly the kidneys and brain. There is evidence of a link between arterial stiffness, arterial hypertension, and structural brain abnormalities in elderly people; the association between systemic vascular disease and  $\beta$ -amyloid deposition is of even greater interest.<sup>46</sup>

No autopsy was performed on Roosevelt; nor was neuroimaging technology available at the time. However, it is highly likely that he would have had subcortical small vessel disease and the characteristic pathological changes that predict cognitive dysfunction. The final outcome, in the form of massive brain haemorrhage, is also consistent with this clinical and pathological scenario.

The Yalta talks were criticised for many years. Some of this criticism concerned the outbreak of the Cold War and Russia's success in Eastern Europe; the role of

Roosevelt, who was accused of handing Eastern Europe to the Soviets, has also been questioned.<sup>47</sup> The president's cardiologist, Dr Bruenn, would later comment that "I have often wondered what turn the subsequent course of history may have taken if the modern methods for the control of hypertension had been available."<sup>9,13</sup>

## Conclusions

Many years after Roosevelt's death from neurological catastrophe due to malignant progression of arterial hypertension, arterial hypertension continues to be the most prevalent risk factor for cerebrovascular disease, and the greatest population attributable risk.<sup>49</sup> This modifiable risk factor is present in around 50% of strokes in all major regions of the world, regardless of ethnic group, sex, or age.<sup>50</sup> Arterial hypertension may also be a potentially modifiable risk factor for cognitive impairment, given its prevalence and the possibility to treat and control it.<sup>51</sup> It continues to be necessary to develop effective blood pressure monitoring programmes, helping to ensure primary prevention of stroke and cognitive impairment.

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## Conflicts of interest

The authors have no conflicts of interest to declare and have received no funding.

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