

The history of hypertension to 1950



Professor
Robert Tattersall

Today's diabetes world is fast-moving and exciting; knowledge is accumulating at an astonishing rate. To help understand the present, however, it sometimes helps to examine the past.

In this instalment of *Tattersall's Tales*, Robert Tattersall looks at the history of hypertension from Reverend Stephen Hales' coining of the term 'blood pressure' in 1708 up until Kempner's evidence for the effectiveness of a low-sodium diet in 1948. The next instalment will take us to the present day.

The term 'blood pressure' was first coined by the Reverend Stephen Hales (1677–1761) who, in 1708, measured it directly in the carotid arteries of two horses. Hales used water, but in 1828, the French physiologist Jean Poiseuille (1797–1869) used a mercury manometer. An advantage was a much smaller piece of equipment – Hales found a pressure of 8 feet of water compared to Poiseuille's 174 mmHg. Since it involved opening an artery, these methods were not practical in humans, in whom the existence of hypertension was inferred from the hardness of the pulse.

The classic disease with a hard pulse was chronic nephritis, described by Richard Bright (1789–1858) of Guy's Hospital, London, in 1827. Frederick Akbar Mahomed (1849–1884), also of Guy's Hospital, is credited with being the first to measure blood pressure clinically using a sphygmograph and a screw, whereby the pressure needed to occlude the arterial wave was measured in troy ounces. He studied the form and pressure of the pulse in hundreds of patients and gave the first description of essential hypertension in 1877 when he wrote:

'It is very common to meet with people apparently in good health who have no albumen in the urine, who constantly present a condition of high arterial tension when examined by the aid of the sphygmograph.'

In older people it could be present for many years without any problems but eventually led to epistaxes, 'a passing paralysis, [or] a more severe apoplectic seizure'. Mahomed made the memorable comment that 'if their noses did not bleed, their brains would' (Cameron and Hicks, 1996).

At the beginning of the 20th Century, there was considerable doubt about whether hypertension was a disease *sui generis* or simply a consequence of atherosclerosis. In England, Sir Clifford Albutt (1836–1925), allegedly the model for Lydgate in *Middlemarch*, was credited with convincing his colleagues that it should be taken seriously, writing, 'I have stood alone for years in proclaiming that in a certain class of cases rise of the arterial pressure is the antecedent arterial strain and injury the consequence' (Rolleston, 1929). In 1914, Franz Volhard (1872–1950) and Theodor Fahr (1877–1945) were the first to clearly establish that hypertension might behave in one of two ways and that the distinctive feature of the malignant form, which caused death within 2 years, was arteriolar fibrinoid necrosis. Like Mahomed, Volhard emphasised that what was later called benign essential hypertension had a prolonged and more or less stable course. Death was from heart attacks or strokes and renal failure was rare.

From the beginning of the 20th Century many clinicians noted that hypertension was common in people with diabetes. One suggested explanation was that arteriosclerosis was the primary problem which caused both hypertension and diabetes – the latter through ischaemia

of the pancreas (Kramer, 1928). Joslin, writing in 1937, had little doubt that the importance of hypertension lay in its prognostic significance with respect to complications, and in the possibility that the hypertension was due to a pituitary, adrenal or pluriglandular syndrome. All the cardiovascular complications multiplied in people with diabetes and hypertension: both gangrene and coronary thrombosis were three times as frequent among patients with hypertension as among those with normal blood pressure (Joslin, 1937).

Treatment

While it was clear that malignant hypertension was a 'death sentence' without treatment, it was not clear that treating ordinary hypertension would be beneficial. Many believed that reducing the pressure would seriously reduce cerebral or renal perfusion and was therefore contraindicated. A well-known adage attributed to John Hay, Professor of Medicine in Liverpool, was that 'the greatest damage to a man with high blood pressure lies in its discovery, because then some fool is certain to try to reduce it' (Hay, 1931). This echoed the views of the doyen of British cardiology, Sir James Mackenzie (1853–1925), who, in 1914, wrote that:

'[Our ignorance] does not prevent many people adopting heroic measures for reducing it, without even considering the wisdom or necessity for so doing. That it may be a physiological process for the benefit of the organism is seldom considered [...] we constantly see individuals proceeding to some spa for treatment for high blood pressure, and the spa physician puts an individual through some rigid regime, and, finding the pressure fall, imagines that his treatment has saved the patient from arteriosclerosis.'

(Mackenzie, 1914)

During the 1920s and 1930s one heroic form of treatment was irradiation of the adrenals and/or carotid body. Another was sympathectomy, which was introduced in 1925. It was used for the next 30 years although the results were inconsistent and transient. In some patients the results were spectacular, but there was no test to indicate who was likely to benefit. In a 1949 survey of patients operated on at the Massachusetts General Hospital, evidence of long-term benefit was found in only 21%. In 52% blood pressure was not significantly lower than before operation, while 27% of the patients had died. Until the 1950s, the only effective antihypertensive drug was thiocyanate, which was introduced in 1932 (Hines, 1946). During the last year of his life (1945), the US President Franklin Delano Roosevelt was treated with bed-rest, weight reduction, phenobarbitone, thesodate, aminophylline, mersalyl and digitalis for his malignant hypertension (Bruenn, 1970).

Weiss's satirical summary in 1939 of the then current treatment of hypertension is probably quite accurate:

Tattersall's TALES

'What has been done in an effort to reduce the blood pressure? Because of an ill founded idea that protein was responsible for hypertension and kidney disease, the patient was denied meat and eggs, and especially red meat, which for some reason was looked on with particular dread. His diet was rendered even more unpalatable by the withdrawal of salt. Sympathy would doubtless have been extended to this half-starved fellow except that he was probably not able to eat anyway, his teeth having been extracted on the theory that focal infection had something to do with hypertension [the concept of focal infection originated with Frank Billings in Chicago in 1915, but was carried to its zenith by the psychiatrist Henry Cotton, the subject of Scull's excellent book (Scull, 2005)]. Even before this he had sacrificed his tonsils and had had his sinuses punctured because of the same theory. In case some food had been consumed, the slight colonic residue was promptly washed out by numerous colonic irrigations, especially during the period when the theory of auto-intoxication was enjoying a wave of popularity. To add to his unhappiness he was often told to stop work and exercise. Of course, he was denied alcohol and tobacco as well as coffee and tea, and as a climax to the difficulties of this unfortunate person he may now fall into the clutches of the neurosurgeon, who is prepared to separate him from his sympathetic nervous system.'

(Weiss, 1939)

Weiss criticised two current paradigms. The first was that essential hypertension was a qualitative disease which had 'arrived' when the patient's pressure had passed a particular dividing line when 'only the exertions of the physician can then save him from premature death and disablement' (Weiss, 1939). The other was that vascular disease in malignant hypertension progressed independently of the blood pressure. The former, according to Weiss, was associated with over-treatment and misery and the latter with under-treatment and failure to save a life which could be saved.

In fact, there was an effective treatment which cost nothing. As early as 1904 it had been shown that salt restriction lowered the blood pressure in patients with Bright's disease. In 1922, Frederick Allen, of starvation treatment fame, treated 180 cases of severe hypertension by restriction of salt for up to 3 years. Pressure was restored to normal in 19% but the treatment had no effect in more than half (Allen, 1922). In 1944, Walter Kempner (1903–1997) introduced his rice diet. Kempner was a German nephrologist who emigrated to Duke University, North Carolina in 1934. He believed that

disease could be prevented and cured through diet and prescribed a high protein, low sodium diet of white rice and canned fruit. The crucial aspect of this diet, at least where hypertension was concerned, was its negligible sodium content (6 mEq per day) and Kempner soon abandoned the high protein element. In 1948 he produced clear evidence that it was effective in severe hypertension, with papilloedema disappearing in 17 of 23 patients. Of 500 patients treated with the diet for between 4 and 898 days, the average fall in pressure was 47 mmHg systolic and 21 mmHg diastolic (Kempner, 1948). The English Medical Research Council confirmed these findings but it was difficult to get patients to follow the diet because of its deadly monotony. Kempner himself recognised this, commenting that it was disagreeable medicine and that the only reason for using it was that 'it helps'. Later the rice diet was commercialised and extended into the treatment of obesity – Durham, North Carolina, became known as the 'Lourdes of Lard' and the patients as 'Ricers'! Kempner was a reclusive autocrat who forced patients to collect 24-hour urines which he tested for sodium and posted the results on a community bulletin board. One patient described a visit to his office as like being invited into the headmaster's study. In 1973, a patient alleged that the unmarried Kempner had a long-standing sexual relationship with her, whipping her with a riding crop when she strayed from the diet and keeping her as his sexual slave for 20 years. The lawsuit was settled out of court after Kempner's death; Duke University did acknowledge that Dr Kempner had used a riding crop on several patients in the past, but stopped at the request of the university!

Perhaps your local PCT should employ a Kempner clone to whip their hypertensive/diabetic patients into shape?

Allen FM (1922) Treatment of arterial hypertension. *The Medical Clinics of North America* **6**: 475–81

Bruenn HG (1970) Clinical notes on the illness and death of President Franklin D. Roosevelt. *Annals of Internal Medicine* **72**(4): 579–91

Cameron JS, Hicks J (1996) Frederick Akbar Mahomed and his role in the description of hypertension at Guy's Hospital. *Kidney International* **49**(5): 1488–506

Hay J (1931) The significance of a raised blood pressure. *British Medical Journal* **2**: 43–7

Hines EA (1946) Thiocyanate in the treatment of hypertensive disease. *The Medical Clinics of North America* **30**: 869–77

Joslin EP (1937) *The Treatment of Diabetes Mellitus*, 6th edition. London, Henry Kimpton, page 391

Kempner W (1948) Treatment of hypertensive vascular disease with rice diet. *American Journal of Medicine* **4**: 545–77

Kramer DW (1928) Hypertension and diabetes. *American Journal of Medical Science* **176**: 23–31

Mackenzie J (1914) *Diseases of the Heart*. Oxford University Press, London

Rolleston HD (1929) *A Life of Sir Clifford Albutt*. Macmillan, London

Scull A (2005) *Madhouse: a tragic tale of megalomania and modern medicine*. Yale University Press, Newhaven, USA

Weiss E (1939) Recent advances in the pathogenesis and treatment of hypertension – A review. *Psychosomatic Medicine* **1**: 180