

'Irascible and tenacious temper' - John Hunter, coronary artery disease and anger.

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On the 16th October 1793 the renowned surgeon John Hunter attended a meeting at St George's Hospital, London. The meeting followed a series of confrontations between Hunter and other board members regarding the enrolment of a young Scottish student to the medical school who, like Hunter, had limited formal education.¹ As the meeting became more heated Hunter *"immediately ceased speaking"* and left the room where he succumbed to a *"tumult of his passion"* and *"fell lifeless into the arms"* of a colleague. Hunter's post-mortem examination was conducted by his brother-in-law Sir Everard Home. Following the discovery of *"thickened and ossified"* coronary arteries Home attributed Hunter's death to his heart being *"unable to carry out its functions, whenever the actions were disturbed, either in consequence of bodily exertion and affections of the mind"*.²

Whilst Hunter was famous for his contributions to surgery, he was infamous for his temper. Lord Holland, a personal friend, described him as possessing an *"irascible and tenacious"* temper and prone to becoming *"dogmatic and angry"*. Thomas Pettigrew commented in The Lancet in 1839 that Hunter *"had no control over his Temper"* and that in life he had acquired *"the disgusting practice of swearing"*. Hunter himself was aware of his temper and is purported to have said that his life *"was in the hands of any rascal who chose to annoy and tease [me]"*.² This relationship between anger and coronary artery disease, what it meant for John Hunter and what it means for the modern clinician, is the focus of this essay.

Anger has long had a place in medical history. The 4th century Roman emperor Valentinian I is said to have suffered a stroke immediately following an outburst at his

generals.³ The ancient theory of the four humours linked an excess of yellow bile with anger.⁴ 13th century alchemist Arnald of Villanova wrote a physiological description of anger describing it travelling to the heart where it influences it to become large and warm in preparation for seeking revenge. Many medieval authors stressed the importance of moderate amounts of anger in keeping the body warm and counteracting the effects of low temperatures.⁵ As previously mentioned Hunter and his contemporaries were aware of the effect his anger had on his cardiac symptoms. He had experienced increasingly frequent attacks of angina since 1775, “*especially after an occasion of any extra exertion or mental anxiety*”.²

Hunter made significant contributions to the knowledge base of cardiac anatomical pathology including describing numerous congenital abnormalities of the heart and describing the anatomical variant of a bicuspid aortic valve.⁶ His records show that he performed a post-mortem examination on at least three individuals who to the modern eye would be diagnosed with coronary artery disease.⁷

The physician William Heberden, who published the first description of angina in 1768, approached Hunter to ask him to perform a post mortem on an individual who had contacted Heberden after his reports’s publication. This individual was a physician who recognised the symptoms described by Heberden as those he was experiencing and requested a post-mortem examination on his death. Hunter was assisted in this post-mortem by Edward Jenner (most famous for his work in smallpox vaccination). It appears that the coronary arteries were not examined in any great detail as Heberden had not speculated on the pathophysiological cause of the symptoms described.⁸

In the case of Mr Rook, who died suddenly following a fit of anger in March 1775, Hunter noted coronary artery ossification (in a parallel to the findings at his own post-mortem).⁷ Although it is unclear if Hunter made the clinical correlation between these post-mortem findings and the cause of death in Mr Rook's case (and in the other cases he examined) his work was inspirational for those who pioneered the modern understanding of coronary artery disease such as Jenner and Caleb Parry. Jenner wrote to Heberden in 1786 and told him of a post-mortem he had witnessed in a patient who had a clinical diagnosis of angina. He described seeing *"a kind of firm fleshy tube, formed within the [coronary] vessel, with a considerable quantity of ossific matter dispersed irregularly through it"*. He theorised that he, along with Hunter, may have overlooked the coronary arteries in their previous post-mortems due to them being contained within the pericardiac fat. In 1799 Caleb Parry first published the coronary artery theory of the pathogenesis of angina pectoris and credited Jenner for the suggestion that angina *"arose from some morbid change in the structure of the heart"* and the description of *"malorganisation"* of the arteries.⁸ In one of the earliest known clinicopathological correlations in the study of angina, Jenner noted that *"the importance of the coronary arteries and how much the heart must suffer from their not being able to perform their functions (we cannot be surprised at the painful spasms) is a subject which I need not enlarge upon, therefore shall only remark that it is possible that all of the symptoms may arise from this one circumstance."*⁹

Jenner had come to his own conclusions that Hunter's chest pains were a manifestation of angina following visiting him in Bath (where he had gone to recuperate) in 1785. He told Heberden that he was reluctant to share his thoughts with Hunter as *"it may deprive him of the hopes of a recovery."*⁸ Sir Everard Home wrote to Jenner after his post-mortem examination to confirm his suspicions, *"It is singular that the circumstance you mentioned to me and you were always afraid to touch upon with Mr. Hunter should have been a*

*particular part of his complaint, as the coronary arteries of the heart were considerably ossified.*⁹

This “*ossific matter*” identified within blood vessels described by Jenner and Hunter is what is now known as atherosclerotic plaque. Angina is the clinical manifestation (chest pain, shortness of breath) of myocardial ischaemia and is most commonly secondary to arterial occlusion (or coronary artery disease) caused by atherosclerosis.¹⁰ High levels of circulating cholesterol result in structural changes to arterial walls allowing a mix of lipids and foamy macrophages to accumulate within. This fatty streak will eventually be covered by a fibrous cap forming a plaque with a central necrotic core. As these plaques increase in size they become more prone to rupture resulting in morbidity and mortality from the sequelae of atherosclerotic disease such as stroke or myocardial infarction.¹¹

Much is known about risk factors for the development of atherosclerosis and coronary artery disease. These include smoking, hypertension, obesity, high cholesterol, genetic factors and psychosocial factors.¹² Amongst the earliest research into the impact of psychosocial and emotional risk factors was in the controversial area of personality types. In 1959 Friedman and Rosenman published that there was an increased risk of coronary artery disease in those with type A personality types or behaviours (ambitious, quick to anger, time and goal focussed). Whilst further research has shown that the link between coronary artery disease and personality type is inconclusive, it is amusing to note that Hunter fits the stereotypical profile with his aforementioned temperamental personality and working habits that saw him “*in his dissecting room before six in the morning*” and finishing work at “*one or two in the morning, or even later in winter*”.¹³ The lack of conclusive findings in the evaluation of personality types and their relations to coronary artery disease has led to a number of studies focussing on anger explicitly.

A systematic review and meta-analysis of 9 case-crossover studies concluded that there was a statistically significant, transient, increased risk of cardiovascular events (such as unstable angina or myocardial infarction) within the first two hours following an angry outburst. The absolute risk was higher for those with other baseline risk factors (smoking, hypertension, etc.) and who had more frequent episodes of anger and hostility. For individuals with a high 10 year cardiovascular risk score, five angry outbursts a day would result in an additional 657 cardiovascular events per 10 000 per year. This review speculated that the causative mechanism was due to a range of factors including activation of the sympathetic nervous system and the release of inflammatory and pro-thrombotic factors which accelerate plaque formation and rupture.¹⁴ Other systematic reviews have come to similar conclusions although have highlighted consistent difficulties in study interpretation such as the variability in the socialisation of anger between different cultures and how 'anger' is measured.¹⁵

One study has examined the impact of the type of anger and its relationship with coronary artery disease. This was a population based, observational prospective study which used trained clinicians to record interviews with participants and classify the types of anger exhibited (rather than relying on self-reporting of anger as had been used in previous studies). This was followed by 6584 person-years of follow up to record subsequent rate of coronary artery disease related events. This study classified the types of anger into three different types - constructive, destructive justification and destructive rumination. Constructive anger (channeling anger into problem solving) was associated with a reduced risk of coronary artery disease in men. Both types of destructive anger were associated with a higher risk of coronary artery disease for men and women.¹⁶ From what we know of John Hunter's personality it seems that he would more than likely fit into the destructive categories of anger thus putting him at increased risk. As with previous studies this study

highlighted differences between the genders when it came to cardiovascular risk and the differing expressions of anger (including varying constructive or destructive traits). As the first female professor in the UK was appointed in 1908¹⁷ and the first female fellow of the Royal College of Surgeons was granted entry in 1911¹⁸ it is highly unlikely this gendered response would have had much influence at the infamous and ultimately fatal October 16th 1793 board meeting at St George's.

It may be argued that the advances in knowledge in the 18th and 19th centuries particularly in the realms of anatomy and pathology by individuals such as Hunter and Rudolph Virchow (the father of modern pathology) created a distance between clinician and patient when compared with earlier bedside medicine by compartmentalising disease into its physical components (organs and cells). For example under the humoural model the psychological features of excess of yellow bile (such as anger) would have been correlated with the physical (jaundice and liver dysfunction). Even the advances in clinical medical technology such as the invention of the stethoscope by René Laennec in 1816 quite literally put a physical distance between doctor and patient.⁴

It could therefore be argued that there is a degree of irony that the scientific revolution Hunter was a part of may have overlooked the significance (or at least pathogenesis) of his anger on his health. This statement may however be considered unfair as despite the evidence discussed for the correlation between anger and coronary artery disease, evidence regarding the impact of psychological interventions (including anger management) has been inconclusive. A Cochrane review found that there was no evidence of psychological interventions having an effect on mortality from cardiovascular events or for which intervention or population would be most beneficial or likely to benefit.

¹⁹ Research in this area is also constrained by the subjective nature of anger, confounding factors and a relatively small number of studies.^{14, 15, 16}

In conclusion whilst Hunter unquestionably made a vast contribution to cardiac anatomical pathology he could also be seen as a case study in his own right for the link between anger and coronary artery disease. Although research in this area in the modern era is not conclusive perhaps there is some cautionary advice for us in Hunter's fate as we live, work and attend meetings in what some have called 'the age of anger'.²⁰

Word count - 1988

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